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## IN THIS ISSUE

VACCINATION against influenza has received considerable publicity in recent months and interest in this preventive measure is general for influenza is a major cause of disabling illness. The available evidence concerning the efficacy of the vaccine and the history of its development are reviewed by Dr. Thomas Francis, Jr. in "A Consideration of Vaccination Against Influenza." The well-controlled studies by the Influenza Commission of the Preventive Medicine Service of the Army on the effect of subcutaneous vaccination among Army personnel have clearly demonstrated that the vaccine does greatly reduce the incidence of influenza although every vaccinated person does not gain immunity. Present evidence indicates that the vaccine is specific for the influenza viruses and probably has no effect on other respiratory infections.

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One of the Sections at the Fund's 1946 Annual Conference was the Round Table on Postwar Problems of Migration. Two of the papers presented at that Round Table appear in this issue. The remaining papers will be published in subsequent issues of the *Quarterly*, and reprints of the total series will be bound together eventually.

The initial paper of the series, "Migration and the Population Potential of Monsoon Asia," is contributed by Dr. Irene B. Taeuber. Asia has over half of the world's population and most of her people live under conditions of indescribable poverty and ill health. Yet her birth rates remain high and the outlook is for increasing population pressure. The author concludes that "Neither international migration nor land settlement which occurs within the existing economic and cultural

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matrix can do more than postpone briefly the demographic tragedy inherent in the continued proliferation of Asia's peoples. But international migration, land settlement, internal redistribution, and urbanization which are aspects of expanding agricultural and industrial economies can contribute substantially both to the support of Asia's population during the period of accelerated growth that accompanies modernization and to the retardation of that growth."

In the second paper of the series, "Future Migration Into Latin America," Dr. Kingsley Davis describes a different situation. Unlike Asia, Latin America is commonly regarded as a sparsely settled and undeveloped area that needs more people. Several Latin American countries profess to seek immigrants in order to increase their population and to develop their economy. As a rule, however, they exclude Orientals and have little except agricultural opportunities to offer. After assessing the possibilities in various sections, Dr. Davis concludes that the prospects for large overseas migration to Latin America are remote because the region cannot attract the kind of immigrants it wants and does not want the kind it can attract.

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The series of articles under the general title "Social and Psychological Factors Affecting Fertility" is continued in this issue. These studies are based upon a large mass of intensive data collected in Indianapolis from a group of married couples meeting specific requirements for the Study. In their article "The Planning of Fertility" P. K. Whelpton and Clyde V. Kiser discuss the frequency and success of attempts to plan fertility and on the basis of these and other data present a classification of the couples by "planning status." They discuss the impact of voluntary family limitation on number and spacing of children and on the general fertility of the urban group considered.

## A CONSIDERATION OF VACCINATION AGAINST INFLUENZA<sup>1</sup>

THOMAS FRANCIS, JR., M.D.<sup>2</sup>

WITH your tolerance, I shall just talk rather than give a prepared report. First, let me give a brief background of the studies which have led to the present status of vaccination against influenza.

The problem of vaccination against influenza has had a continuous history of intense activity since 1933, when the British workers, Smith, Andrewes, and Laidlaw, first reported the isolation of the virus from persons apparently suffering from influenza. This was preceded a few years by the studies of Shope and Lewis which identified the disease called swine influenza as being caused by a virus in association with a bacterium of the *Haemophilus influenzae* variety. Investigations have been constantly in progress since that time.

Our work began in 1934, when we were able in this country to confirm the observations of the British workers in the isolation of a virus from epidemic influenza.

At the present time there are two types of influenza which have been identified: the original one, isolated in 1933 and first confirmed in 1934, which is now called influenza A. Influenza A was identified subsequently every two years up until 1940. It skipped 1942 but appeared in 1943, so that up until 1940 there were five epidemics in alternate years, one in 1943, and if chronology means anything, the betting odds would be rather long on the probabilities of having influenza A this year.

In 1936 we encountered an epidemic, widespread throughout the United States, which also seemed to be influenza, but we were not able to recover the previously identified virus nor were we able to get any serological information that the influenza which we knew had been in circulation. In 1940 we

<sup>1</sup> Presented at the Twenty-Third Annual Conference of the Milbank Memorial Fund, October 29-30, 1946.

<sup>2</sup> Department of Epidemiology, Virus Laboratory, School of Public Health, University of Michigan.

had the same experience but with a little more good luck; we were able to isolate a virus which had many of the characteristics of the previously known virus except one: it gave no immunity against the previous one. By a brilliant piece of thinking, we called that influenza B.

Clinically, it is very much the same as influenza A; epidemiologically, it has certain differences. One of the major epidemiological differences is that it has been recognized at intervals of four to five years. Secondly, in the course of an epidemic such as that of 1945, it was possible to demonstrate that influenza B had been in circulation in the United States and other parts of the world for a full year, a course quite contrary to the epidemiological behavior of influenza A, which has occurred in short epidemic outbreaks which are ordinarily over in two months.

Another important difference between the two is that immunity to one does not give immunity to the other. This can be shown by repeated inoculations of experimental animals such as the white mouse, which is readily immunized, and testing them with the heterologous virus without demonstrating immunity. Furthermore, the individual who recovers from influenza A does not develop antibodies to influenza B, or vice versa; so that in the sense of prevention and epidemiology and problems of immunity, we are actually talking of two diseases which nevertheless are caused by influenza viruses.

Since 1933 it has been possible to identify the recurrent peaks of the respiratory disease as influenza A or B. The bi-annual epidemics of influenza A from 1934 to 1940 and the epidemic in 1943 after a three-year interval have been mentioned. After isolation of influenza B in 1940, we were able to show that the epidemic in the early months of 1936 was influenza B by testing the virus isolated in 1940 against serum which we had saved since 1936. Again in 1945, influenza B was identified. We know of no epidemics in this period that would be called influenza C. For instance, in 1942-1943 there was decided evidence that the prevalent respiratory disease was

atypical pneumonia. No virus was isolated and there was no evidence that it was another form of influenza by any of the serological tests or by any of the attempts to isolate viruses of a similar nature.

The next point in the basic data that I should like to emphasize relates to the manner in which influenza virus produces its injury, because I think that this has certainly colored our approach to immunization and our thinking on the outlook for control of the disease.

First of all, influenza virus infection is a very rapid one. The sequence of events as observed in the ferret's nose illustrates the injury done by the virus. At the point that influenza virus is introduced into the animal's nose, a very rapid and selective injury takes place. In twenty-four hours after inoculation, exudate is beginning to accumulate in the respiratory turbinate, and at forty-eight hours there is a great deal of exudate. The normal ciliated columnar epithelium is completely destroyed, wiped off by the virus; and the adjacent olfactory epithelium ordinarily is left untouched. The primary action of the virus is on the ciliated epithelium of the respiratory tract. It is selective. It is my belief that this is the primary injury and the primary site of localization of influenza virus, while the pneumonia which occurs in experimental animals is secondary to this damage to the epithelium of the larger air passages.

On this basis it seemed probable that the most effective manner of getting protection would be to apply measures which would be protective at the site at which the virus localizes, the site at which the virus enters the system. In other words, if one could supply immunity to the area where virus alights and would produce its primary injury, that would be the desirable, the ideal circumstance.

It had been shown very clearly, and it can be shown in experimental animals, that one may have antibodies in the blood without having complete immunity. An animal which has antibodies may still have this damage to the respiratory epi-

thelium. We were a little interested in how the antibodies in the blood could have an effect upon this local injury.

In the course of our studies, antibodies were found in the nasal secretions. As an individual recovered from the disease, the amount of antibody in the nasal secretion increased, presumably by exudation or secretion through the membranes from the blood. It is our interpretation that antibodies in the blood have their effect primarily by being exuded into the nasal secretion, where they would protect the tissues at the site where virus would enter and produce its primary injury. On the basis of these observations, for a considerable period our belief was that prophylactic methods, whether active or passive, employed by way of the respiratory route, would appear more likely to produce the desired effect.

Certain other studies had been carried out by various workers in mice. Mice were allowed to inhale a spray of immune serum, and it was shown that one could get actual protection of the mice under those circumstances.

In 1943 and earlier, we had attempted to immunize by spraying the virus into the respiratory tract of individuals but were unable to get consistent effects. In 1943, through the Influenza Commission,<sup>3</sup> a group of studies were carried out in which individuals were sprayed with immune serum and then sprayed with virus. We found no protection whatever, although physiologically and logically, this approach offered many advantages over the pararespiratory route for immunization.

In considering the other mode of vaccination, which I should like to do from here on, one can go back to studies which were undertaken in 1935. At that time it was shown that the virus of influenza ordinarily produced infection only when given by way of the respiratory tract. Essentially that is true. If one gave the virus, even in its fully active form, subcutaneously or intraperitoneally, one did not get infection, but resistance and the development of antibodies were observed. It seemed, there-

<sup>3</sup> Commission on Influenza, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army. Preventive Medicine Service, Office of the Surgeon General, United States Army.

fore, that if one were to carry out this procedure in the human individual and obtained an increase in antibody formation, this might also be associated with protection.

Groups of individuals were inoculated with active virus grown in tissue culture to find out what happened. They did not take sick, even though some of them were inoculated when they had common colds. There was no illness produced by the inoculation of active virus and antibodies did develop. From that time on, the thought concerning the development of subcutaneous vaccination against influenza maintained this concept: that if virus could be given subcutaneously by other than the natural route, without producing infection, this might have a beneficial influence on resistance, as it did in experimental animals.

A number of studies were carried out up to 1941. Hoyle and Fairbrother carried out some in England with centrifuged material. The group in London at the National Institute of Medical Research had used formolized ferret and mouse lung; Stokes and his associates used mouse lung and tissue culture; Muckenfuss and Siegel at the New York City Board of Health had carried out some studies with tissue culture virus; and in 1940 Horsfall and his associates at the Rockefeller Foundation carried out studies with a preparation which presumably was a mixture of distemper virus and influenza virus.

None of these studies gave evidence that the vaccination had any significant effect against the natural disease. There were several reasons for this. In some instances there probably was not enough virus used; in others, when vaccination had been done against influenza A, the epidemic was influenza B. In others, after the vaccination was carried out, there was no epidemic; so that by a series of misfortunes, evidence that was significant was not obtained.

In 1941, with the beginning of the war activities, the Influenza Commission was formed under the Army Epidemiological Board through the Surgeon General's office of the Army. Since influenza, because of the epidemic of 1918, was considered by



many people to be a war disease, it was thought one might anticipate another calamitous epidemic of that variety. The Influenza Commission was given as an assignment the question of possibly finding out whether immunity could be induced against the disease by vaccination with inactive virus.

At about this time, work with the embryonated egg had become more and more prominent. It had been shown that the influenza virus grew very rapidly in the chick embryo, that the virus also reached a relatively high concentration in the extra-embryonic fluids, such as the allantoic fluid surrounding the egg. In 1941 we obtained from a number of the commercial firms material suggested by them and prepared from the allantoic fluid. This was allantoic fluid in which influenza virus A was grown and simply inactivated with formalin and then a bacteriostatic agent added. I do not know what happened at that time, but of the five preparations which we were given for testing, three had no immunizing potency in experimental animals, and two of them had very little.

One thing which had become quite obvious was that as one inactivated virus, one lost potency. We then turned to the idea that by concentration of virus one might be able to compensate for the loss of potency which occurred during inactivation.

The other observation, which at least to me was impressive, was that if one used a vaccine subcutaneously which gave rise to a good level of antibodies in the blood, one also increased the amount of antibody in the nasal secretion. Prior to this time it had been rather difficult for me, at least, to see how the simple raising of antibody titers in the blood was going to protect the respiratory area where the virus might get in and produce tissue damage before circulating antibodies would have a chance to come into play.

The question of concentration of vaccine then came up. Hirst, and Hare and McClelland at about this time had reported that virus could be concentrated by a precipitating method. If allantoic fluid in which the virus was present were frozen and then allowed to thaw at about zero degrees, a pre-



precipitate formed and on the precipitate most of the virus became adsorbed. One could then remove the supernatant fluid and, in the precipitate, would get the great bulk of the virus.

Through the Influenza Commission, efforts were made to have some of this prepared for study but we were unable to obtain sufficient material promptly because of the difficulties in maintaining a sterile product. It was at that time that in our laboratory we took advantage of other important observations of Hirst and Hare. They had shown independently that the virus of influenza in the egg fluid became adsorbed to the red blood cells of the chick. If, as the egg was being opened and the virus in the fluid was being harvested, one ruptured the blood vessels and allowed the red blood cells to come out of the blood vessel into the fluid and then collected that fluid and the red blood cells in a cold flask, the virus became adsorbed to the red cells which settled to the bottom. One could remove the supernatant fluid and still retain most of the virus on the red cells. Then all that was needed was to add about one-tenth that volume of a simple solution, such as sodium chloride, bring it up to incubator temperature or room temperature, and the virus would come off the red blood cells. Under those circumstances one could get in 1 cc. of fluid the approximate amount of virus that could be obtained from the 10 cc. of the original fluid. The virus was readily inactivated with formalin, 1:2000, and still retained a high degree of antigenicity.

In 1942, anticipating an epidemic of influenza A on the two-year cycle, through the Influenza Commission we undertook studies of vaccination using material prepared by one of the commercial firms for the Commission in the manner described. In the vaccine were included the viruses of both influenza A and influenza B in equal amounts, so that 1 cc. would contain the equivalent of the virus from 5 cc. of influenza A fluid and from 5 cc. of influenza B fluid.

We vaccinated approximately 8,000 individuals in two institutions in Michigan and Doctors Magill, Plummer, and Smillie also carried out studies at Cornell. In the 8,000 that we vac-

inated, we maintained alternate controls so that each group within these institutions was divided horizontally, each ward or room being divided so that one person would get the vaccine and the other would get an inoculation of control material. We then sat down to await the epidemic. Well, it did not occur. That was the year it skipped.

However, we were able to do certain things. We were able to study the amount of antibody produced by the vaccine and to find, contrary to certain statements about antibodies and their persistence after vaccination, that at the end of three to four months the fall in antibody titer was slight. At this time, hoping to salvage information, we proceeded to test the resistance of some of the people by actual infection. Individuals who had been vaccinated four and a half months earlier and others who had not were sprayed with influenza virus, type A. Another group was revaccinated two weeks before exposure. Of the ones not vaccinated, 50 per cent came down with temperatures of 100° or more, temperatures up as high as 102° or 103°, with parallel clinical symptoms. Among those who had been vaccinated two weeks before, the incidence of illness was approximately 15 per cent, and none of these had temperatures higher than 100°. Of the ones vaccinated four and a half months before, approximately 30 per cent showed signs of disease.

We also took other groups that had been vaccinated under the same circumstances and tested them by spraying them with influenza B. Forty per cent of the controls came down and 10 per cent of the vaccinated, irrespective of whether they had been vaccinated four and a half months before or two weeks before, had illness but none of the latter had fever as high as 101°. This was a clear demonstration that in a test sufficiently severe to bring down 40 to 50 per cent of the controls, vaccination definitely had exerted an influence in limiting the amount of the disease that showed up.

This result was in contrast to what we had found when we sprayed people with active virus and then resprayed them four

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months later with the same virus in the active form. Under those circumstances we did not get as much protection as in the ones that had been vaccinated subcutaneously with inactive virus. It did not seem entirely hopeful because if the natural disease does not give a prolonged immunity, and if the experimental disease produced by spraying active virus does not, it would appear that one could not expect too high a degree of resistance; but the results with the subcutaneous vaccination were better than those following the artificial infection.

On this basis, the next year we proceeded to carry on a more extensive study. This was set up in the ASTP units in universities throughout the country. Six groups of workers from the Influenza Commission participated. The vaccine used in all instances was the same as I have mentioned, and it was given in the same alternate manner—1 cc. inoculation of the vaccine, while alternate individuals received 1 cc. inoculations of salt solution. Each company was divided half and half, so that each unit could be compared within itself rather than with another.

This time we were a little more fortunate because two weeks after the vaccination had been carried out there was an epidemic, and it was influenza A. There were approximately 6,250 men vaccinated, and 6,250 controls in these different units throughout the country. The character of observation was rather uniform, and the investigations for the detection of virus and serological tests made by the different groups within the Commission were essentially the same.

At the University of Michigan there were approximately 1,800 men involved. The epidemic was of the explosive type with rapid development and decline. It started in mid-November, 1943, and lasted about six weeks. The incidence of hospitalized cases diagnosed as influenza, those with temperatures of 100° or more, was 2.3 per cent in the vaccinated, and 8.6 per cent in the control group, nearly 4 to 1. For the noninfluenzal local respiratory disease, or dispensary cases with less than 100° temperature, there was no significant difference between

the vaccinated and control groups. This tends to show that the effect of vaccination is a relatively specific one against influenza.

For all the institutions in which studies were carried out, the total incidence of the disease in the 6,200 vaccinated individuals was 2.2 per cent for the total period, and in the controls it was 7.11. The one place in which the results were out of line was in California where there was no significant difference between the vaccinated and the controls. In the other institutions, however, it was quite uniform and quite similar. In some groups there was a difference of 6 to 1 in favor of the vaccinated individuals. It does show that there was not complete elimination of what was diagnosed as influenza from the vaccinated group. Nevertheless, it was the first clear-cut demonstration that subcutaneous vaccination had actually created a significant difference between vaccinated and control groups in the course of a natural epidemic of the disease.

There is an interesting point for discussion that comes out in these studies. There are reasons to doubt that the incidence in the controls of 7.1 per cent represents the true incidence of the disease in the general unvaccinated population. Both at the University of Michigan and at the University of Minnesota, there happened to be companies of men who for certain reasons were not included in the study. In the one instance the incidence of the disease was 20 per cent, and in the other the incidence was 30 per cent, as opposed to the incidences of 9 and 8 per cent, respectively, in the control group of the vaccinated population, suggesting that vaccination of 50 per cent of the population, as has been indicated frequently, had a definite influence upon the incidence of the disease in the controls as well as in the vaccinated individuals.

There was another interesting observation that came up in the studies at City College of New York and at Iowa. The epidemic began just about the time vaccination was completed, and in the tabulation of the results it was extremely interesting to note that there was no difference in incidence between the

vaccinated and the controls during the first week, while after that the curves diverged very sharply so as to indicate that the effect of vaccination became evident at about five to seven days after inoculation, which would coincide with what we know about the time at which antibodies develop. It was a rather fortunate set of observations which were not planned but nevertheless would suggest that approximately five to seven days after the inoculation, the influence of the vaccine on the incidence of the disease can be detected.

On the basis of these results the Influenza Commission recommended to the Board that widespread vaccination be carried out in the Army during 1945. Provisions were made for obtaining the material, and in October, 1945, practically all the Army was vaccinated.

It looked as if it would be impossible to get any data as to the effect of vaccination, but in November, 1945, an epidemic of influenza B became very prominent in the civilian population, although we had for eight months prior to this been able to identify spotty epidemics throughout the United States, throughout the Pacific area, the West Indies, and to some extent in Europe. But this was a rather sharp upsurge of the disease in the form of an epidemic. At the University of Michigan there were 600 men in the Army group who had been vaccinated on October 16th; there were 1,100 men in another service unit, not Army, who had not been vaccinated. The epidemic began about the 1st of November and all of these men were being taken care of through the student health service under the same conditions, so it was possible actually to add up the score by the number of admissions from these units.

From the first week in November until December 22nd, when the Christmas recess occurred and furloughs, transfers, and all those things broke up the entire study, this is what happened: There were 109 admissions from the 1,100 unvaccinated, and 7 admissions from the 600 vaccinated men. Influenza B virus was isolated from throat washings of sampled patients at intervals throughout the study. Serological studies of 45 cases

were done, and 85 per cent of them were positive for influenza B, pointing again to the fact that the disease was essentially a clear epidemic of influenza B.

These results were paralleled by observations at Yale by Hirst and the staff of the student health service there. The numbers were almost the same. I think there were 550 vaccinated Army men and 1,100 unvaccinated in the other service. In that instance the epidemic occurred in a similar manner and the incidence in the vaccinated unit was 0.5 per cent; in the unvaccinated unit it was 12.5 per cent; so there is a ratio of more than 10 to 1 in favor of the vaccinated individuals.

There are two reasons why the influenza B results might be sharper than the influenza A results which we previously discussed. One is that influenza B may be a better immunizing agent than influenza A. There are reasons to think that is so. Secondly, it may be that one is comparing a totally vaccinated with a totally unvaccinated population.

The incidence of respiratory disease in the vaccinated Army forces in the same area as the University of Michigan at the time the epidemic was prevalent, and the incidence in another branch of the service in the same geographical area which was not vaccinated, showed strongly confirmatory evidence of the results obtained in the smaller unit.

One other point of interest is that the strains of influenza B that were encountered during the last year were in some respects quite different serologically from those that were used in the vaccine. Nevertheless, the effect of the vaccination seemed to be sufficiently great to protect against these different strains.

These are the data upon which we have been moving. The duration of effect, frankly, is not known. In other words, in a given individual, I do not think we can say how long immunity will last. There are certain data which are suggestive. I mentioned the studies we carried out in the institutions in 1942. When the epidemic of influenza A occurred in 1943, this institution was still under observation and we were able to deter-

mine the incidence of the disease in the groups one year after vaccination had been carried out. There were a number of wards in which about 40 per cent had been vaccinated a year earlier, and other wards of a similar character in which no vaccination had been carried out. The incidence of recognized illness in those groups was tabulated.

In the unvaccinated female wards the incidence in all but three was from 6 per cent up to 29 per cent—quite a wide variation. In the vaccinated female wards the highest incidence was 6.5 per cent. In the vaccinated male wards, the highest incidence was 4.4 per cent and many of them had little or no disease, whereas in the unvaccinated wards the incidence was from 2 to 18 per cent, suggesting that as long as one year after vaccination there was an effect. For all groups on the unvaccinated wards the incidence of the disease was 12.4 per cent. In the wards where approximately 40 per cent had been vaccinated, the incidence was 1.9.

These are presumptive data and are subject to obvious criticisms and objections. Nevertheless, they are indications. Hirst and his associates with similar studies in one of the prisons of New York State, where they had vaccinated with a different preparation, also felt that at the end of one year the incidence was reduced one-third in those that had been vaccinated the year before.

Additional data concerning the duration of immunity may be derived from information as to the persistence of antibodies. There is a general trend indicating that in either unvaccinated individuals of the general population or in vaccinated groups the incidence of the disease declines as the level of antibodies rises. When a general population is vaccinated the median level of antibodies is pushed to a considerably higher level. At the end of two weeks it may be ten times the height observed before vaccination.

After three to four months it will still be at two-thirds of the peak level and at the end of the year at one-half peak level, but still considerably higher than the pre-vaccination median.



This persistence of antibodies can certainly be taken to indicate a persistence of the effect of vaccination. If the increased level of antibodies after this time reflects increased resistance, then the observations indicate that increased antibody levels and resistance are demonstrable at the end of a year.

Another point is that by vaccination one can influence the antibody level of a population more effectively than by allowing persons to go through an epidemic, because you can actually pick your population, whereas in an epidemic perhaps not more than 25 to 30 per cent of the population is involved.

Another question that has been very widely discussed is that of reactions. Why do we get reactions and what are the reactions? There are two types. The one with which we have been most commonly confronted is of the type observed with many vaccines, similar to that seen with typhoid vaccination: a local redness, swelling, tenderness at the site of inoculation and a certain proportion of individuals who may have fever and aches and pain.

Some people felt that these reactions were due to egg protein that was in the vaccine, but we have been able to demonstrate that that was not the case, because one could inoculate the individuals with the whole allantoic fluid and not get the reactions. Furthermore, it was possible to show that the number of reactions increased as the amount of virus in the preparation was increased. I think the evidence is quite clear that the amount of reaction is largely related to the virus content. In the preparations that have been employed, there has been considerable variation in the number of reactions and also perhaps in the amount of virus present in the preparation. The suggestion has been made that one can reduce the amount of virus below the level at which reactions are common and get sufficient immunization. That is something for further study.

It is probable that with further technical development the number of reactions will be definitely reduced. In a group of approximately 1,000 persons who were vaccinated last week under our observation, about 1 per cent had febrile responses.



A second type of reaction is related to the matter of sensitization. It has been constantly urged that one must be careful with individuals who are naturally sensitive to eggs. The only anaphylactic reactions of which I am aware occurred in individuals who had known sensitivity to egg. The amount of sensitizing material in allantoic fluid is extremely small and in individuals who have had repeated inoculations we have not seen the development of sensitivity. It may develop, but it certainly is not a common effect.

We have heard comments upon the development of jaundice following influenza vaccine. That is not the case, and I think that belief is drawn from the analogy with yellow fever vaccine with which jaundice occurred at one time. The only instance of which I know when jaundice developed was in the controls of a given study not made by the Influenza Commission who, by a rather unfortunate choice, were given plasma for the control inoculation. In them there was a relatively high incidence of jaundice. But in the ones who received the vaccine, jaundice was not encountered.

We have also heard comments that neurological manifestations had followed influenza vaccination. Among the 7,000,000 men who were vaccinated in the Army, this was not reported.

With respect to the materials being offered for civilian use at present, the Influenza Commission has had nothing to do with their licensing. All I can say is that they are licensed by the National Institute of Health; the original standards they presume to employ are those which were set down for the acceptance of vaccine for Army use. The Washington Letter of the Journal of the American Medical Association, dated October 29, 1945, stated that: "The Public Health Service reported that commercial houses have applied for the right to manufacture the new serum—meaning vaccine—but that the Government had declined to license it for public use." On December 8th, it said that the National Institute of Health had sent a memorandum to producing laboratories saying the favorable consideration would be given to qualified manufacturers, and the

letter of December 17th stated that the material "is now on the market for civilian use."

There is a variety of preparations. There are those prepared by centrifugation, which may have certain advantages. Those are largely matters of production. There is material which is being prepared by calcium phosphate precipitation. There is the material which I think is probably being prepared, although I am not sure, by precipitation with other materials. The comparative advantages of these are not known. The essential problem is a matter of production of effective material. If they are stable, if their potency is high, there is no reason why the one vaccine might not be as effective as the other. However, there are at present no data other than serological to afford a comparison between them.

In this review I am sure there are many things I have not said. I would like only to repeat that the data are the evidence which was obtained in experimental studies, and the results are a demonstration, through close epidemiological and laboratory observation, that subcutaneous vaccination has a definite influence upon epidemics of influenza A and influenza B. If there were a pandemic such as that of 1918—and this is the question that is often asked—what would it do? I think there, again, one would have to say that the results would depend upon the antigenic character of the strain of influenza virus that would be present. My hunch is that it would be a strain similar in its basic characteristics to strains with which we are familiar. However, it might be antigenically different or it might be antigenically the same. The results of vaccination would certainly depend upon that. Another factor would be its virulence and the effect of present therapeutic agents such as the sulfonamides and penicillin and others upon secondary invaders.

## MIGRATION AND THE POPULATION POTENTIAL OF MONSOON ASIA<sup>1</sup>

IRENE B. TAEUBER

**T**HREE hundred years ago there were fewer than 300 million people in non-Soviet Asia. Today there are 1.2 billion. Three hundred years from now, if the demographic history of the East were to parallel that of Japan or the West, there would be from four to eight billion. It is not likely that such populations will actually exist in the Asia of the future, but they would exist if the agricultural-industrial revolution of the last three centuries should continue to develop and diffuse throughout the non-Western world, with demographic consequences similar to those that accompanied the economic transformation of Europe and Japan.

Asia's peoples have been increasing at perhaps three-fourths of one per cent per year; continued increases of at least this order of magnitude are inevitable in the coming decades unless political instability, the disintegration of local and regional order, economic retrogression, and the correlated famines and epidemics result in drastic increases in death rates. But indefinite continuation of growth is impossible. In the long run, the population increases created by declining mortality can lead only to greater decimations by famine and disease unless they are gradually lessened and ultimately eliminated by declining fertility. The present report is a tentative and partial assessment of the factors involved in the past and potential future growth of Asia's people, with the emphasis placed on the role of migration in the acceleration or retardation of that growth. It is unfortunate that study must be limited to the experience of those admittedly selected areas which have reasonably accurate statistics. Analysis by illustration is always dangerous, but for Asia there are no alternatives.

<sup>1</sup> From the Office of Population Research, Princeton University. The studies of the demography of Eastern Asia which form the factual basis for this analysis would not have been possible without the continuing cooperation of Edwin G. Beal, Jr., Division of Orientalia, Library of Congress.

Asia is an area without unity other than by geographic definition. There are many regions, and in each the present and potential relation of people to resources assumes different forms.<sup>2</sup> In the Near East, population is dense in relation to developed resources and the rate of population increase is high, but the major barriers to the achievement of demographic balance at adequate levels of living are political and ethnic rather than economic. In arid regions across the continent nomads still increase or decrease in numbers according to the varying hazards of nature. In the mountains, semi-nomadic peoples clear the forests by fire, plant their crops for a season or two, and move on when the soil is exhausted. Across the continent and in the islands there are enclaves of primitive peoples, some in process of depopulation, some in symbiotic relationships with the encroaching civilized groups. Most of these people live in precarious dependence on the meager subsistence available to them locally, but their numbers are relatively small, their economic relationships limited. The problems they pose to Asia and the world are only tangential to those created by the proliferation of peoples that has accompanied the impact of the West on the rice cultures of the low-lying plains and river valleys of Monsoon Asia.

#### THE DEMOGRAPHY OF RICE AGRICULTURE

The major key to the settlement, distribution, and growth of population in the great coastal arc stretching from India through Southeastern Asia and the Netherlands East Indies to China and Japan is irrigated rice.<sup>3</sup> Broadly speaking, the great

<sup>2</sup> A brief statement of the thesis which follows was presented to a joint meeting of the Academy of World Economics and The Industrial College of the Armed Forces on May 3, 1946 and published in *Social Research*, October 1946, xxi, No. 4, pp. 306-309, as *Trends of Population in Non-Soviet Asia*.

<sup>3</sup> Wickizer, Vernon D. and Bennett, M. K.: *THE RICE ECONOMY OF MONSOON ASIA*. Stanford University, California, Food Research Institute, Grain Economic Series 3, 1941, 358 pp. For Japan: Trewartha, Glenn T.: *JAPAN. A PHYSICAL, CULTURAL AND REGIONAL GEOGRAPHY*. Madison, The University of Wisconsin Press, 1945, 607 pp. For Java and the Philippine Islands: Pelzer, Karl J.: *PIONEER SETTLEMENT IN THE ASIATIC TROPICS*. New York, American Geographical Society, 1945, 288 pp. The more detailed pattern of agricultural utilization and population distribution in

historic and contemporary cultures have been rooted in the river valleys and the low-lying plains. Here rural settlement is extraordinarily dense, reaching as high as two thousand persons per square mile of land area in the Ganges Valley of India, the Tonkin delta of French Indo-China, and the valleys of China. But adjacent to the areas of extremely dense settlement are relatively empty spaces, areas that might support much denser settlement than they now have under some type of agricultural utilization other than rice. In French Indo-China 38 provinces outside the rice area occupy 72 per cent of the total land area of the country but contain only 18 per cent of the total population.<sup>4</sup> In 1930, Java and Madura supported 818 persons per square mile, the Outer Islands 28. In Monsoon Asia density is largely a function of the relative prevalence of delta, plain, and mountain land. Within low-lying areas, it is roughly proportionate to the extent and the antiquity of rice agriculture.

The universality of the relationship between paddy rice agriculture and rural population density is due in part to the large subsistence which can be derived from given areas of land, in part to the institutions and values which have evolved and survived as adjustments to the imperatives of a rice economy. Permanent rice agriculture within a given region requires the continuing cooperation of the generations in a stable pattern of relationships. The building of the dykes and irrigation systems, the maintenance of the fertility of the soil, the preparation of the irrigation systems—these represent, not the work of one generation, but the cumulative contributions of generations of men.

The familial social organization which has such high survival value in creating continuity and stability also insures the production of the children who are essential both for biological

relation to the prevalence or absence of lowland rice agriculture can be traced for the various regions of the continent in George B. Cressey's *ASIA'S LANDS AND PEOPLE*. New York, McGraw-Hill Book Co., 1944, 608 pp.

<sup>4</sup> French Indo-China: Demographic Imbalance and Colonial Policy. *Population Index*, April, 1945, xi, No. 2, pp. 68-81.

survival and for economic welfare. The population of a village or a region may be superabundant, but the individual couple without attachment to a larger family group or the labor of their children would be in a hopeless economic situation.

The peoples of the rice areas of Monsoon Asia have always expanded beyond the margin of permanent subsistence, whatever the system of technology.<sup>5</sup> The pressures developed in the settled areas forced expansion outward whenever and wherever technical and cultural conditions permitted. Traditionally such expansion was a slow movement that left relatively untouched the strong familial and local area focus of existence. The Yamato people reached southern Honshu by the first century A.D., but it was a thousand years before they reached northern Honshu, while Hokkaido remained empty in the late nineteenth century. The Annamite peoples reached the Tonkin delta in the tenth century A.D., but it was the nineteenth century before they penetrated the Mekong delta of Cochin China.<sup>6</sup> Closely related to this process of agricultural expansion was the flight from calamity that must have been periodic in all areas prior to the modern period, just as it is today in the famine provinces of North China. There was a development of cities as centers of government, of trade, and of luxurious living for the elite. All these movements produced physical changes in the distribution of people; some of them, especially the agri-

<sup>5</sup> Dr. Chen tentatively explains the cyclical nature of Chinese political and demographic history in terms of this recurrent tendency to the over-production of people. Chen, Ta: *POPULATION IN MODERN CHINA*. Chicago, The University of Chicago Press, 1946, p. 4.

<sup>6</sup> Occasionally these movements may have been merely the outward thrust of individual families escaping the hard existence within the settled center. More often they were the population correlates of an organized extension of the area of occupancy made possible by military, technological, or financial expansion. The Japanese expansion northward in Honshu was the result of military activities, government extension of irrigation systems, subsidized settlement, etc., while the southward expansion of the Annamites occurred through an organized system of military-agricultural colonization. The migrants into Manchuria followed technological developments (the railroads) and capital investments that provided employment opportunities superior to those in the land of origin. But the pressure of people on the resources available to them was so ever-present that out-movements could and did occur whenever changed political, technological, economic or social factors made them possible. The nature of historic and contemporary Asiatic movements is discussed in Part I of Bruno Lasker's *ASIA ON THE MOVE*. New York, Henry Holt and Co., 1945, 207 pp.



cultural expansion, increased the resources available for the support of the population. But they were fundamentally movements within an agrarian matrix that left growth dependent on a high and fluctuating mortality. Even in the seeming exception, Tokugawa Japan, infanticide and abortion were comparable psychologically to a premature infant mortality rather than to fertility control in the modern sense. Migrations were a necessary reaction of people to the vicissitudes of existence. They served to expand cultivated area and to increase the number of people, but they could be only temporary palliatives for the perennial problem of the rice areas, the growth of population beyond the possibilities of subsistence on the land and with the resources and techniques available to it.

#### THE IMPACT OF THE WEST<sup>7</sup>

The economic and demographic impact of the expanding culture of the West on the rice economies of Monsoon Asia differed only in degree from previous changes that had operated to expand the resources base and quicken the rate of population increase. The gradual penetration of the West meant the extension of areas of civil order, epidemic control, minimum protection against endemic disease, and famine limitation through regularization and increase of production and emergency relief. It meant the increase of subsistence both through increased yields from already cultivated acreage and through increased acreage under cultivation. Mortality was limited sufficiently to produce rapid growth as long as the fertility patterns essential to survival in the premodern period continued intact—and as long as subsistence increased rapidly enough to permit the maintenance of the lowered death rates.

The dynamics of population in Formosa reveal in miniature

<sup>7</sup> A comprehensive analysis of both the static and dynamic relationships between population and resources in the Pacific area has recently been published by Warren S. Thompson as: *POPULATION AND PEACE IN THE PACIFIC*. Chicago, University of Chicago Press, 1946, 397 pp. See also: Pelzer, Karl J.: *Population and Land Utilization. Part I* in Field, Frederick V. (Editor): *AN ECONOMIC SURVEY OF THE PACIFIC AREA*. New York, International Secretariat, Institute of Pacific Relations, 1941, 215 pp.

the interplay of geographic, cultural, economic, and political forces which created the population growth that was the almost insoluble dilemma of prewar colonial administration.<sup>8</sup> Formosa was a relatively empty island until the seventeenth century, when it was added to the Empire of the Manchus. Immigration from the crowded mainland provinces of Fukien and Kwantung and high fertility resulted in irregular but continuing population increase, despite economic and health difficulties and a general state of political turbulence. By the end of the nineteenth century the island's population numbered perhaps three million. Then in 1895 the Treaty of Shimonseki awarded Formosa to the Japanese. The effective occupation of the island required the restoration or the imposition of order, while economic exploitation required the development of health and sanitary conditions that would attract Japanese migrants and insure the maintenance and increase of the local labor force. Water works were constructed in the cities, and compulsory vaccination was introduced. Roads and railroads were constructed to permit the expansion of military and civil control and to move the products of the land to the coastal cities for shipment to Japan or abroad. The cultivated area was expanded, techniques were improved, better varieties of crops were introduced, and production was concentrated on those commodities needed by Japan. The native Chinese peoples were maintained in relative isolation from the outside world, with minimum possibilities for individual or group cultural and economic advancement. Their function was that of labor in a commercial agriculture that was to assist in eliminating the dependence of Japan on foreign sources and to contribute to her foreign exchange.

The inevitable result of Japanese administration in Formosa was a decline in the death rate without either a concomitant or a delayed decline in the birth rate. Recorded death rates decreased consistently from 33 per 1,000 population in 1906-1909

<sup>8</sup> Colonial Demography: Formosa. *Population Index*, July, 1944, x, No. 3, pp. 147-157.



to 20 in 1935-1937, aside from a temporary increase during the period of the First World War. By 1926-1930, the infant death rate had been reduced to 174 per 1,000 live births, while the expectation of life at birth for males had reached 39 years. Birth rates, on the contrary, remained relatively constant, ranging from 40 in 1906-1909 to 44 in 1935-1937. The gross reproduction rate was 3.4 in both 1929-1931 and 1934-1936. Net reproduction rates were above 2.0.

The story of Formosa was repeated in its essential details in Korea, Manchuria, the Philippine Islands, the Netherlands East Indies, French Indo-China, Thailand, and India. In some areas, as in Manchuria, there were substantial possibilities for increased agricultural productivity and hence for the continued maintenance of an increasing population within the existing political and technological system. In others, notably Java, the Tonkin delta of French Indo-China, the middle Ganges, and parts of Korea, the population was or soon would have been beyond the limits of permanent subsistence at existing technological levels.

Theoretically there were two solutions to the demographic dilemma of Monsoon Asia: the one, to initiate the transformations that would lead to a reduction of the birth rate; the other, to further intensify and expand production within the existing territory or move people outside into whatever empty or sparsely utilized areas were available. The former solution, which would have tended to an eventual balance between people and resources within given areas, could not be adopted because it would quicken social mobility and discontent among the native peoples and undercut the economic basis of the colonial system itself. The latter, the intensification or extension of agricultural cultivation, was made difficult by the increasing capital expenditures required and the relative scarcity of other than sub-marginal land. Even if temporarily successful, the intensification of agriculture and the expansion of land settlement in the existing cultural matrix could only postpone the population problem created by the profit-motivated dif-

fusion of Western technology.<sup>9</sup> Migration which lessened the number of people within a fully utilized area or increased the amount of land available for their support might result in a temporary improvement in levels of living, but its permanent effect could be nothing other than an increase in the number of people and the equalization of poverty in the old and the new areas.

### THE FUTURE

The colonialism of the nineteenth and early twentieth centuries created the demographic basis from which the future of most of Monsoon Asia must evolve. One billion people now live where only one-fourth that number lived three centuries ago. To project this past trend into the indefinite future could be nothing other than an exercise in the arithmetic of extrapolation. The trends of the past could not have continued for other than a limited period of time, even without the war. How limited it would have been, no one can predict; it would have depended on the extent to which order and stability were maintained, the rapidity of the technical developments, the intensity of the ameliorative programs, and the extent to which the entire product of the land was devoted to the sustenance of people. Sooner or later, unless the economic and cultural changes that lead to the alteration of familial mores and declining fertility had been introduced, demographic catastrophe would have been inevitable.<sup>10</sup> Perhaps it would have come through political disorders, famines, and epidemics, perhaps

<sup>9</sup> The literature on the potentialities and limitations of international migration as partial or complete "solution" to Asia's population problems is immense. Perhaps the most comprehensive of the pro-migration pleas is Radhakamal Mukerjee's *MIGRANT ASIA*. Comitato italiano per lo studio dei problemi della popolazione, Pubblicazioni, Ser. III, Vol. I. Roma, Tipografia I. Failli, 1936, 310 pp. The most incisive statement of the limitations to such migration is W. D. Forsyth's *THE MYTH OF OPEN SPACES*. Melbourne, Melbourne University Press, 1942, 226 pp.

<sup>10</sup> This same statement might have been made of the Europe of the early nineteenth century as described by Marcus Hansen in *THE ATLANTIC MIGRATION*. Cambridge, Mass., Harvard University Press, 1940, 391 pp. Hansen compares the role of the potato in the Western Europe of the early nineteenth century with that of rice in China. Malthus' own work was an extrapolation of the then existing conditions into the future on the assumption that fertility remained relatively unchanged, and hence is directly comparable to the projection of the dynamics of this prewar demographic situation of Southern and Eastern Asia into the indefinite future.

through the less spectacular process of progressive enervation and slowly mounting mortality.

To say that demographic catastrophe was inherent in the continuation of the trends of the prewar period is not to say that it is inevitable. If the fertility of the peasants of the cultures that fringe the Asiatic continent were unalterable, then indeed lowered mortality could be only transitory, but there is abundant empirical evidence within Asia itself that fertility is a culturally determined variable. Its seeming stability reflects merely the essential continuity of the social and economic environment over the endless generations in which men have tilled the soil. Within the Korea of the 'twenties and 'thirties crude birth rates were 46 to 48 per 1,000 total population, while gross reproduction rates approached 3.5.<sup>11</sup> But both crude birth rates and gross reproduction rates revealed wide variations within this general pattern of high fertility, the lowest rates being found in the relatively urban provinces of the South and West, the highest rates in the agricultural and less densely settled provinces of the North and East (Figure 1). Urban-rural differentials were pronounced; the gross reproduction rate of each city in Korea was appreciably below that of the province in which it was located. This same general pattern of fertility differentials existed in Kwantung and Manchuria. In all regions, rural and urban, industrial and agricultural, fertility was lower for the economically dominant Japanese than it was for the Chinese, the Manchus, and the Mongols.<sup>12</sup> The highest fertility was that of the agricultural Koreans of Chientao Province, where the gross reproduction rate of 3.6 reached the heights characteristic of the parent population within the northern provinces of Korea itself. The gross reproduction rates for the Manchurian population reached 3.4 in East Hsingan, declining progressively with increasing urbanization and

<sup>11</sup> Korea in Transition. Demographic Aspects. *Population Index*, October, 1944, x, No. 4, pp. 229-242. Taeuber, Irene B.: The Population Potential of Postwar Korea. *The Far Eastern Quarterly*, May, 1946, pp. 289-307.

<sup>12</sup> Manchuria as a Demographic Frontier. *Population Index*, October, 1945, xi, No. 4, pp. 260-274.

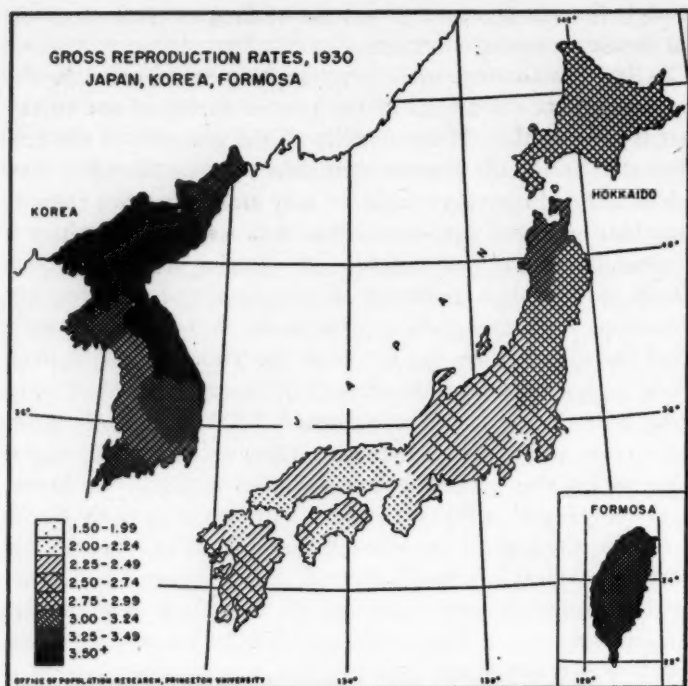


Fig. 1. Gross reproduction rates, 1930. Japan, Korea, Formosa.

increasing migration to reach a low of 2.6 in Kwantung and the South Manchuria Railway Zone in 1935. The reproductive performance of the Manchurian people within the cities is indicated by the gross reproduction rates of 2.2 for Mukden and 2.3 for Harbin in 1940.

This experience within Asia itself indicates that the high and relatively unchanging fertility of the peoples of Southern and Eastern Asia may be due only to the fact that the groups subject to the influence of the new constitute such a small proportion of the total population.<sup>18</sup> If so, the technological and

<sup>18</sup> For an analysis of the experience of India, see: Davis, Kingsley.: *Demographic*

(Continued on page 31)

social changes essential to the increase of industrial product and the improvement of levels of living may be accompanied by declines in fertility, just as they were earlier in the West. But here there is another demographic difficulty. If the East follows the West, the initial effect of the industrial and agricultural developments essential to the increase of product will be further decreases in mortality and an accelerated rate of natural increase. The increase thus generated may jeopardize or make impossible the increasing levels of living that would hasten the diffusion of patterns and values that lead ultimately to slowing fertility and the cessation of growth. The crucial demographic problem for the Asia of the coming decade thus becomes the rate of decline in fertility.<sup>14</sup> The decline in mortality is a dependent variable; to attempt to prevent it would not only be contrary to basic humanitarianism but would retard the rapidity of the economic and cultural transformations on which the attainment of ultimate balance probably depends.

The future population problems of an industrializing Asia can be seen only dimly. The integration of research on agricultural, industrial, and resources potentialities and capital formation is a necessary precondition to meaningful assessment of the demographic future of the area as a whole or any of its regions. Unless and until this is done, discussion of population trends remains somewhat vague and conjectural. None the less, in Asia the numbers are so great, the pressure of people on the land so intense, that analysis of economic potentialities without consideration of existing demographic conditions and the effect of economic changes on population dynamics would be naive if not futile. The intricate interrelationships that will exist between agricultural and industrial developments, popu-

Fact and Policy in India. A chapter in *DEMOGRAPHIC STUDIES OF SELECTED AREAS OF RAPID GROWTH*. New York, Milbank Memorial Fund, 1944, pp. 35-57. Also: Human Fertility in India. *The American Journal of Sociology*, November, 1946, lii, No. 3, pp. 243-254. For China, see: Chen, Ta: *Op. cit.*, pp. 25-31. For a broad resume of historical and contemporary non-European patterns of differentials in urban-rural fertility, see: Jaffe, A. J.: Urbanization and Fertility. *The American Journal of Sociology*, July, 1942, xlviii, No. 1, pp. 48-60.

<sup>14</sup> Notestein, Frank W.: Problems of Policy in Relation to Areas of Heavy Population Pressure. In Milbank Memorial Fund, *op. cit.*, pp. 138-158.

lation redistribution, and rates of population increase can be illustrated from the experience of Japan, the one area within Monsoon Asia that achieved both a substantial degree of industrialization and a rapid decline in fertility.<sup>15</sup>

#### THE EXPERIENCE OF JAPAN<sup>16</sup>

The population of Japan had changed relatively little in the hundred and fifty years prior to 1868, but the apparent stability was the result of a precarious balance between high mortality, periodically raised by famine and epidemic, and high fertility, irregularly undercut by abortion and infanticide.<sup>17</sup> Four of every five persons were directly dependent on agriculture; only one in twenty lived in a city of 50 thousand or more. The transition to an industrial, urban economy was rapid. By 1930 only 47 per cent of the total gainfully occupied population was in agriculture (Figure 2). Both mortality and fertility declined, but the prior decline of mortality resulted in an accelerating rate of natural increase and an increasing labor force. The total population increased from 34.8 million in 1872 to 73.1 million in 1940. The need for migratory outlets for this expanding people was a recurring motif in the literature on Japan's population problem. The need for land for the surplus peasants of Japan was used to rationalize the occupation of Formosa, Korea, and Manchuria, while the failure of land settlement in these areas became the basis for the thesis that the

<sup>15</sup> Here again, in order to make even a broad resume manageable within a few pages, emphasis will be placed on the formal description of the urban transformation and its impact on fertility. A more detailed description and analysis of the interrelationships between migration and the economic and demographic transition that occurred in Japan in the seventy-five-year period from the Meiji Restoration of 1868 to the Surrender of 1945 will be presented later as a section of a monograph on the demography of Japan. The industrial developments that underlay the demographic transitions of the recent period, and the population changes themselves, are described in: Schumpeter, E. B. (Editor): *THE INDUSTRIALIZATION OF JAPAN AND MACHOUKUO, 1930-1940. Population, Raw Materials and Industry*. New York, The Macmillan Co., 1940, 944 pp. See especially E. F. Penrose's section, Japan, 1920-1936, pp. 80-270.

<sup>16</sup> Detailed citations to the sources used in the analysis of both migration and fertility can be found in: Taeuber, Irene B. and Beal, Edwin G., Jr.: *Guide to the Official Demographic Statistics of Japan. Part I. Japan Proper, 1868-1945. Population Index*, October, 1946, Supplement xii, No. 4, pp. 1-36.

<sup>17</sup> Taeuber, Irene B. and Beal, Edwin G., Jr.: *The Dynamics of Population in Japan. A Preliminary Report. In Milbank Memorial Fund, op. cit.*, pp. 1-34.



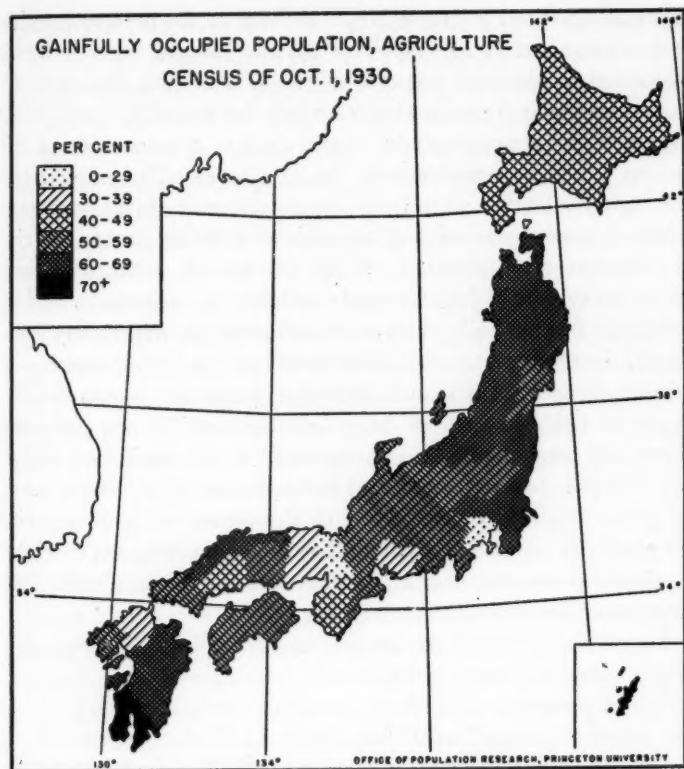


Fig. 2. Japan. Per cent of gainfully occupied population in agriculture, census of October 1, 1930.

Japanese would not migrate and hence that international migration was not relevant to the solution of their problems.

Actually, the Japanese did move, both within and without the empire. During the long seclusion of the Tokugawa Shogunate there were by legal definition neither Japanese abroad nor aliens in Japan. In 1880 there were only five thousand Japanese civilians outside Japan Proper; in 1920 there were 1.3 million; in 1940, there were 3.6 million. Between 1920 and 1940 there was a net out-migration of 1.7 million civilian

Japanese aged ten or above, most of them to the prewar empire or the conquered areas. Japanese outside Japan Proper in 1940 amounted to almost 5 per cent of the 75.4 million Japanese in the world; the increase in their numbers between 1872 and 1940 amounted to approximately 10 per cent of the increase of 37 million which occurred within Japan Proper. The movement was highly selective as to both social-economic status and age. While Japanese moved out to achieve superior status in the government and industry of the conquered areas, Koreans moved in to supply Japan's needs for labor in agriculture and in industry. Numerically the two movements approximately balanced. In the absence of any international or inter-empire migration between 1920 and 1940 the Japanese population of Japan in 1940 would have been only one half of one per cent above the total population enumerated in the census of October 1, 1940. International and inter-empire movements were primarily the human correlates of the economic and imperial expansion of the nineteenth and twentieth centuries, not the exodus of poverty-stricken peasants to a life offering only subsistence on an agricultural frontier.

There was frontier expansion to serve as a demographic safety valve for Japan during the early decades of industrialization and modernization, but it was an internal movement to the northern islands of Hokkaido.<sup>18</sup> In 1868, Hokkaido's 89 thousand square kilometers were inhabited by only 60 thousand Japanese and a few thousand Ainu; in 1940, the 3.3 million Japanese in Hokkaido constituted almost one-twentieth of the Japanese resident in Japan Proper. Between 1868 and 1920, Hokkaido's population increase of 2.4 million was 11 per cent of the total increase of 21 million that occurred within Japan Proper. Even this over-all rate of absorption does not measure the contribution of the northern frontier to the demographic difficulties of an industrializing Japan, for Hokkaido's migrants came predominantly from the more backward areas

<sup>18</sup> Hokkaido and Karafuto: Japan's Internal Frontier. *Population Index*, January, 1946, xii, No. 1, pp. 6-13.



of Honshu; she had absorbed 10 per cent of the total number of provincial migrants enumerated in the 1930 census, but 37 per cent of those from the six northern provinces. This frontier movement was minor after 1920, however, for the youth of Hokkaido were maturing. By 1930 surplus manpower was moving out to other regions of Japan Proper, to Karafuto and to Korea.

Japan's extension of land settlement within the southern islands and her frontier expansion into Hokkaido were integral parts of the planned transformation of the handicraft feudalism of the Tokugawa period into the military-industrial feudalism of the modern period. The increase of agricultural production within Japan Proper and the development of the resources of Formosa and Korea supported the total population of Japan Proper at generally increasing levels of per capita consumption, while Hokkaido formed a part of the expanding mining, industrial, and commercial nexus of the new Japan. In fact, Hokkaido illustrates in almost experimental form the contributions and the limitations of pioneer settlement, whether agricultural or industrial, as a solution to problems of population pressure in densely settled regions with high rates of natural increase. The emigration of a portion of the surplus population of the densely settled rural areas to the frontier contributed to an increasing national income and an improving balance between people and resources, but its contribution to the reduction of national fertility was limited. The migrants to the expanding frontier in the north retained relatively intact the high fertility patterns of the rural areas from which they came. There was a secular drift downward, since the people of the maturing frontier were also subject to the economic pressures and the cultural transformations of the larger industrializing society. Land settlement and frontier expansion, whether within or outside Japan, were demographic palliatives during a period of rapid economic transformation. They were not permanent solutions, for, once occupied, the frontier regions became areas of population pressure that required still fur-

ther migratory outlets to maintain a continuing balance between expanding numbers of youth and employment opportunities.

For Japan as a whole, the primary migratory process was neither international migration, movement within the Empire, land settlement, nor frontier expansion, but the absorption of the natural increase of the rural areas in the cities and in non-agricultural occupations. The farm population remained superabundant even for the technological levels of Japanese agriculture, but there was no general pile-up on the land during Japan's period of rapid increase. If the occupational statistics can be trusted, the number of families dependent on agriculture in 1939 was actually less than it had been in 1886.

Analysis of the detailed dynamics of change in the population of the rural areas of Japan is handicapped by the fact that there is no meaningful classification of urban and rural in the Japanese statistical system. If we use the official Japanese definition of "rural" as including all people outside the boundaries of incorporated municipalities, the "rural" population increased from 45.9 million in 1920 to 46.6 million in 1935, then decreased to 45.5 million in 1940. If we hold the incorporation factor constant by taking the population living at each census date within the boundaries of cities as they existed in 1941, then the "rural" population increased from 39.4 million in 1920 to 44.7 million in 1940, a 14 per cent increase in twenty years. If we take the population living outside towns of 10 thousand or more, which Japanese students regard as a more realistic definition of rural, then there was a decline from 37.9 million in 1920 to 36.6 million in 1940. This comparison is invalidated to an unknown extent by the fact that towns may increase to over 10 thousand either by population increase or by consolidation, and there is no measure of the latter.

Whatever measure of the rural population is taken, it is apparent that it changed relatively little in the period from 1920 to 1935, and decreased from 1935 to 1940. However, there were wide regional variations, with a pile-up in the agricultural

provinces of the northeast and depopulation in the regions surrounding the large cities and in the southwest.

The population increase of any limited area is a function of both natural increase and net migration. In Japan, as in all countries of the West, fertility was highest in the most agricultural provinces, lowest in the most urban provinces (Figure 1). Migration, on the other hand, was related not only to the existing pressure on the land and the theoretical availability of migrants but to the nearness and the desirability of employment opportunities outside agriculture and the suitability of the potential migrants to take advantage of the employment opportunities available. In the period from 1920 to 1940 all Japan contributed to the development of eight provinces: the six containing the cities of Tokyo, Yokohama, Nogoya, Osaka, Kobe, and Kyoto, and the newer mining and heavy industry centers of Fukuoka and Yamaguchi, the latter gaining only in the armament period from 1935 to 1940. Interprovincial migration was highest, not where fertility was highest and economic levels lowest, but where opportunities were most easily accessible and a tradition of migration established. The provinces losing the largest proportion of their natural increase by net migration were those adjacent to the Big Six metropolitan provinces and the southwestern provinces; the provinces with the highest rates of natural increase were those of the northeast.

The impact of this pattern of provincial gain and loss by migration on the labor force and the social-economic structure was greater than even the overall numbers indicate. The 1930 place-of-birth statistics show that the provinces containing the Big Six cities and Fukuoka had had a net gain by interprovincial migration amounting to 24 per cent of their 1930 population, while the other 40 provinces had had a net loss of 11 per cent (Figure 3). But at each age between 15 and 50 the seven metropolitan provinces had gained over 30 per cent of their manpower by net migration, while the other 40 provinces had lost over 15 per cent. The age pattern of this migration is

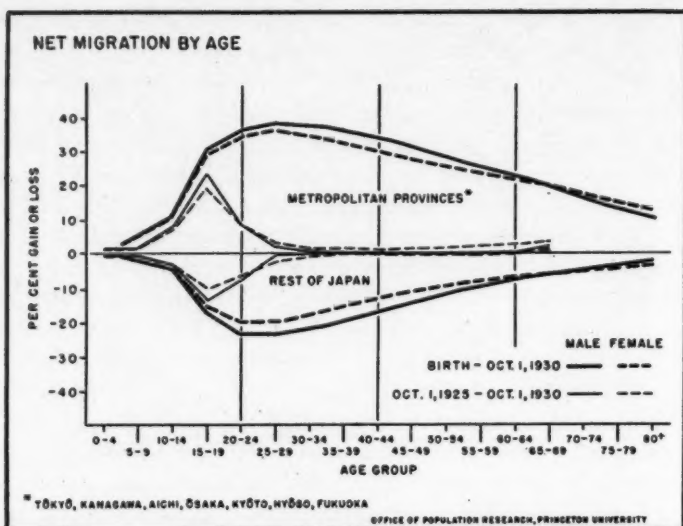


Fig. 3. Net migration by age, metropolitan provinces and remainder of Japan from: I. Birth-October 1, 1930 II. October 1, 1925-October 1, 1930.

indicated roughly by the age pattern of the net migration between 1925 and 1930. Net gain or loss by migration reached its maximum in the age group 15-19, where for males the seven metropolitan provinces gained a number equal to almost one-fourth their total 1930 population, while the other 40 provinces lost 14 per cent. An analysis of the age pattern of net migration for these same areas at successive censuses indicates that the seven metropolitan provinces held the high net immigration at ages 15-19 and absorbed still more migrants at ages 20-24 and 25-29. After age thirty, gains and losses by migration approximately balanced.

The net movement of youth from the farms and the rural areas of Japan prevented the development of an increasing pressure of population on the land while Japan passed through her period of rapid population increase. It also provided the demographic base for the rapid growth of cities that accompanied the transition from agrarian feudalism to industrial

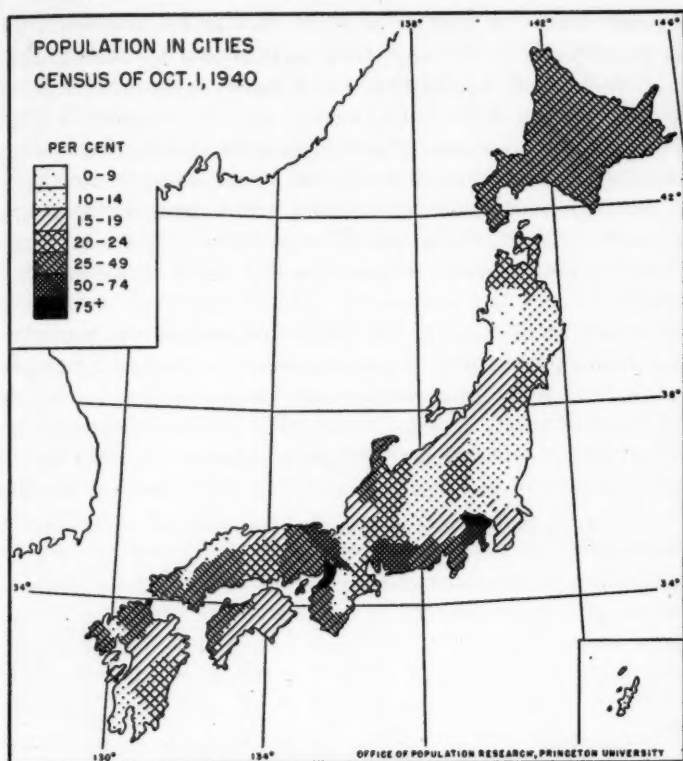


Fig. 4. Japan. Per cent of the population in cities, census of October 1, 1940.

militarism. In 1940, 27.6 million people, 38 per cent of the total population of Japan, lived in the 168 incorporated cities. One-fourth lived in cities of 100 thousand and over, 18 per cent in the Big Six cities alone (Figure 4).

If the progressive urbanization of Japan had been accompanied by no changes in fertility, it would have meant only temporary escape from the perennial problem of the rice areas, the balancing of numbers and the means for their subsistence. Urbanization, however, was more than the physical movement

of people from one area to another. It was a transition from the countryside to the city, from agricultural to non-agricultural work, from a subsistence to a money economy. It lessened the rigidity of the family system and the compulsive force of the traditional mores. Furthermore, the children who were essential to economic well-being and social status in rice agriculture depressed the level of living and increased the inconvenience of life in the cities. The traditional family patterns of the Japanese peasant migrant yielded and fertility declined rapidly.

Fertility at the time of the Meiji Restoration was probably at a level represented by a gross reproduction rate of 3.2 to 3.6. By 1920 the gross reproduction rate for the nation as a whole had declined to 2.7. From 1920 to 1940 decline was characteristic of all areas of Japan. The gross reproduction rate for all cities declined from 2.1 in 1920 to 1.8 in 1935; that for the Big

Table 1. Japan. Gross reproduction rates, 1920-1940, actual and hypothetical.<sup>1</sup>

AREA	1920	1925	1930	1935	1940
ACTUAL TRENDS					
TOTAL <sup>2</sup>	A.2.66 B.2.70	2.61 2.57	2.40 2.36	2.31 2.21	2.06 2.04
Non-city	2.86	2.76	2.56	2.49	—
City	2.07	2.02	1.82	1.75	—
Under 50,000	2.09	2.14	1.86	1.84	—
50,000-99,999	2.19	2.09	1.93	1.81	—
100,000 to "Big Six"	2.28	2.12	1.92	1.81	—
"Big Six"	1.98	1.93	1.73	1.70	1.61
HYPOTHETICAL TRENDS					
I. City Population as in 1920, Fertility Changing	2.70	2.61	2.43	2.37	2.37
II. City Population Changing, Fertility as in 1920	2.70	2.67	2.64	2.56	—
III. City Population and Fertility as in 1920	2.70	2.71	2.72	2.73	2.74

<sup>1</sup> Age distributions from the Census of October 1, 1940 are available only for the total country, provinces, and the "Big Six" cities.

<sup>2</sup> Actual Total A is based on the most precise possible estimate of the number of births for Japan as a whole; Actual Total B is based on the sum of the estimated number of births occurring in city and non-city areas.

Six cities of Tokyo, Yokohama, Nagoya, Osaka, Kobe, and Kyoto declined from 2.0 in 1920 to 1.6 in 1940; that for the population outside cities declined from 2.9 in 1920 to 2.5 in 1935 (Table 1).

The influence of urbanization is measured only in part by decline in the fertility of the city population, for the continuing movements of people between urban and rural areas facilitate the diffusion of urban influences throughout the countryside. The movement of an increasing proportion of the total population from high-fertility rural areas to low-fertility urban areas further depresses national fertility. This influence of the changing proportions of city and non-city populations on national fertility can be assessed quantitatively. The national gross reproduction rate for Japan declined from 2.7 in 1920 to 2.3 in 1935. Two-thirds of this decline in national fertility was due to the decline in the fertility of city and non-city areas, one-third to the transfer of people from one type of area to the other.<sup>10</sup> If we add to this one-third the proportion of the decline in national fertility that was due to the decline of fertility within cities and the proportion of the decline in non-city fertility that was due to the influence of the rural-urban movement, it becomes apparent that the decline in fertility was essentially a correlate of the urbanization process.

#### SUMMARY AND CONCLUSIONS

From the first movements of Stone Age men into the low valleys along the Pacific shores, Asia has been at once the land of the peasant and the land of the migrant. Permanent rice agriculture required the continuing cooperation of the generations in a stable pattern of relationships. Traditional behavior, the identity of past, present, and future as an eternal and unchanging process, the repudiation of the deviant, the abhorrence of change—these were the psychological characteristics that accompanied the familial social structure and, in conjunction with it, facilitated survival in the rice deltas for hundreds

<sup>10</sup> This transfer may be due to physical movement or to the incorporation of a non-city area of residence into a city.



or even thousands of years. But biological survival was achieved at the cost of a recurrent over-production of people in relation to the resources available for their support. Periodic maladjustments within the settled areas generated pressures that forced peasants outward to occupy new lands, but since the familial mores were transferred intact the ultimate effect of such migrations was not the relief of pressure but an increase in the number of people living under pressure. Migrations throughout the long history of Asia served to diffuse people, culture, and poverty, not to solve population problems.

The family and local group mores that had facilitated survival in the premodern period produced severe maladjustments when Western economic and political expansion resulted in a lessening of the forces of mortality that had made high fertility essential. The international migrations, the intensification and rationalization of agricultural production, and the settlement of new lands which accompanied the colonialism of the nineteenth and twentieth centuries were palliatives for this imbalance between levels of fertility and mortality, not permanent solutions in the sense that they contributed materially to the achievement of a balance between people and developed resources within local areas or for the continent as a whole. It is the fundamental tragedy of Asia that three centuries of population increase had to occur with only minimal declines in fertility, without which there can be no permanent humanitarian solution to the population problem. Population quadrupled, the empty lands were utilized, but population potential remained essentially unimpaired.

Neither international migration nor land settlement which occurs within the existing economic and cultural matrix can do more than postpone briefly the demographic tragedy inherent in the continued proliferation of Asia's peoples. But international migration, land settlement, internal redistribution, and urbanization which are aspects of expanding agricultural and industrial economies can contribute substantially both to the support of Asia's population during the period of accelerated

growth that accompanies modernization and to the retardation of that growth. In Japan, international migration and land settlement provided support for appreciable proportions of the natural increase generated by the modernization process and contributed to the economic and political development of both Japan Proper and the Empire, but it was the movement of the peasant to the city that was of preeminent importance. Urbanization reduced the pressure of people on the land, lowered the fertility of the peasant migrant in the city, and diffused the new values throughout the rural areas.

The demographic history of Imperial Japan parallels that of the nations of the West, except that both urbanization and the transition from high to low fertility were accelerated. If this experience of the one nation in Monsoon Asia that has achieved a substantial degree of industrialization can be transferred to project the future of the other cultures, industrialization and urbanization will lead eventually to declines in fertility that will first lessen and then eliminate the growth that accompanies modernization. There are two major uncertainties, however. The first concerns the validity of the assumption that the East is to achieve internal order, increasing agricultural productivity, and an expanding industrial economy. The second is whether, even under these circumstances, international movements, frontier expansion, urbanization, and declining fertility can operate rapidly enough to permit an accelerating decline in mortality such as that which accompanied the industrialization of the West and Japan. In Asia numbers are so great, the pressure of people on subsistence so intense, that time is crucial. Asia cannot afford to permit the transition from high to low fertility to evolve as a by-product of the pressures and the stimuli generated by the urbanization process. Levels of living, perhaps existence itself, for a large portion of that half of the world's people who live within Monsoon Asia may depend on the rapidity of the cultural developments through which numbers are related directly to the potentialities for their support within the familial social structure of the rural areas themselves.

## FUTURE MIGRATION INTO LATIN AMERICA<sup>1</sup>

KINGSLEY DAVIS

DEMOGRAPHICALLY speaking, the potential migration pent up in today's world is enormous. Not only is the earth's total population increasing at the fastest rate ever known, but the increase is extremely unequal as between different regions.<sup>2</sup> Generally the fastest growth is occurring in the poorest regions, the slowest growth in the richest. As a result the previous inequalities of population distribution are being aggravated rather than alleviated. Certain backward, primarily agricultural regions are glutted with people and are showing signs of even greater glut in the future,<sup>3</sup> while other areas, primarily industrial, are casting about for means of increasing their birth rates. Between the two kinds of areas the differences in level of living are fantastic. What more natural, then, than to expect the destitute masses of the underprivileged regions to swarm across international and continental boundaries into the better regions? The situation is analogous to atmospheric pressure. The human population of the earth is characterized by high and low pressure areas, and one expects an inevitable current of migration from one zone to the other.

Actual migration, however, is not governed solely by high and low pressure. It is governed by economic costs, political barriers, ethnic attitudes, and limited horizons.<sup>4</sup> So it is not safe to predict the volume of future migration on the basis of impoverished density alone.

Among the regions commonly believed to be enjoying a low demographic pressure, and therefore to be open to mass immi-

<sup>1</sup> From the Office of Population Research, School of Public and International Affairs, Princeton University.

<sup>2</sup> See World Population in Transition. *Annals of the American Academy of Political and Social Science*, January, 1945, Vol. 237, various articles.

<sup>3</sup> DEMOGRAPHIC STUDIES OF SELECTED AREAS OF RAPID GROWTH. New York, Milbank Memorial Fund, 1944.

<sup>4</sup> Hutchinson, Edward P. and Moore, Wilbert E.: Pressures and Barriers in Future Migration. *Annals*, loc. cit., pp. 164-171.

gration, is Latin America.<sup>5</sup> The reason for this opinion is that the area has less than its share of the world's population, as indicated by its lower than average density. Whereas it embraces 16 per cent of the world's inhabitable land area, it has only about 6 per cent of the world's people. Except for Africa and Australia, it has a lower density than any other major region. Asia (excluding the USSR), with a population of almost 1.2 billion, has an over-all density nearly seven times that of Latin America. Also, the Latin American region, especially South America, is known to have tremendous expanses of territory, rich in resources, where little exploitation has occurred and few people live. One thinks of the Amazon valley, a virtually uninhabited basin as large as the United States,<sup>6</sup> of the vacant plains of Argentina,<sup>7</sup> the unworked forests of Southern Chile,<sup>8</sup> the Llano country and Guiana highlands of Venezuela<sup>9</sup>—huge areas that could undoubtedly support large populations. Surely in a crowded world Latin America offers a vast potential opportunity for millions of people.

This view, popular inside as well as outside the region, is not so much wrong as naive. It jumps from a demographic fact to a social conclusion. There is no doubt that under certain conditions Latin America's physical capacity to absorb migrants could be realized. But there is grave doubt that the proper conditions will come to pass. Briefly it can be said that Latin America cannot attract the kind of immigrants it wants and does not want the kind it can attract; and also that it does not need mass immigration anyway. The evidence follows.

#### THE MYTH OF THE FOREIGN PIONEER

One sign that Latin America will not receive many immi-

<sup>5</sup> In this paper the term "Latin America" is used to cover the entire area south of the United States.

<sup>6</sup> Hanson, Earl Parker: *THE AMAZON: A NEW FRONTIER?* New York, Foreign Policy Association, March 20, 1944.

<sup>7</sup> Bunge, Alejandro E.: *UNA NUEVA ARGENTINA*. Buenos Aires, Guillermo Kraft, 1940, Chaps. VII, X.

<sup>8</sup> McBride, Geo. McCutcheon: *CHILE: LAND AND SOCIETY*. New York, American Geographical Society, 1936, Part II.

<sup>9</sup> James, Preston E.: *LATIN AMERICA*. New York, Odyssey Press, 1942, pp. 68-74.

grants is her lack of industry. Her present stage of industrial development has been compared to that of the United States in the 1870's, which means a 70-year lag.<sup>10</sup> Of course, there is much evidence that industrialization will continue at a rapid pace, and, on the analogy of the United States, this suggests an enhanced immigration. But things have changed since 1870. Mature industrialized areas are now more numerous, and new ones more widespread; also, the world movement of goods and peoples is now more controlled. Most significant of all, the old regions from which industrial immigrants were formerly drawn—first northwestern Europe and then southern and eastern Europe—can no longer furnish immigrants in great abundance, because their rate of population growth has declined markedly. Countries faced with potentially declining populations are often unwilling to allow their citizens to emigrate. The few surplus laborers available for migration from European countries will be in demand either within Europe itself or in other industrial areas (e.g., the Dominions) that promise higher returns than Latin America offers.

Actually, however, when the Latin Americans think of immigration they are not thinking of industrial laborers. They are thinking of farmers and farm laborers, because these are what they want. Like peoples everywhere, they want somebody else to do what they themselves are loath to do—in this case the hard labor on the big estates or the pioneer farming in the hinterland. Of the two types of agriculturalist, it is the desire for *estancia* labor that has generally determined the immigration policy of the republics rather than the desire for pioneer homesteaders.<sup>11</sup> But in any case the policy has been directed

<sup>10</sup> Wythe, George: *INDUSTRY IN LATIN AMERICA*. New York, Columbia University Press, 1945, p. 11.

<sup>11</sup> "The shortage of workers, *falta de braços*, is the central theme of Brazil's social and economic history. . . . It would be difficult to find a single treatise which does not make reference to the nation's need for more workers." There has been a 400-year struggle to supply hands for the plantations. First the native Indians were hunted, captured, and enslaved. Then millions of Negro slaves were brought from Africa. Finally, with the abolition of slavery, inducements were offered to bring over millions of cheap European laborers, some permanent and some seasonal. São Paulo

toward securing agricultural rather than industrial personnel. Any tendency of immigrants to settle in cities has been roundly deplored.<sup>12</sup>

Yet, despite policy and desire to the contrary, the city is precisely where the immigrants have tended to settle. Their movement has been, in one sense, a phase of the widespread rural-urban exodus, the peasant of one country simply settling in the city of another. This tendency has accelerated with time, and it means that even in the heyday of immigration into Latin America, which occurred rather late, the main attraction did not come from the open spaces nor did the newcomers settle in the hinterland.<sup>13</sup> Indeed, in all areas of the world, European overseas migration has long ago passed the era when it was directed toward the pioneer settlement of new lands. The direction is now more than ever toward the centers of secondary and tertiary industry. Not only are the new lands accessible to markets already taken up, but industrial areas are now more widespread and offer a higher level of living to the immigrant; also, since Europe has itself become heavily industrialized and

became the champion of a policy of importing labor for the coffee, cotton, and sugar estates of the nation. The states to the south, especially Rio Grand do Sul, pursued a policy of establishing colonists on the land as independent farmers. But on the whole the São Paulo plan won the balance. It systematic recruitment and subsidization of farm hands, gave Brazil the lion's share of her immigration, especially after 1885. Smith, T. Lynn: *Brazil: People and Institutions*. Baton Rouge, University of Louisiana Press, 1946, pp. 160-164, 265-266, 546-547, 557-558.

<sup>12</sup> One objection to Jewish immigration is the tendency of these people to settle in the city, or to use the agricultural colony as merely a way station to the city. See Zorraquín Becu, Horacio: *EL PROBLEMA DEL EXTRANJERO EN LA RECIENTE LEGISLACION LATINO-AMERICANA*. Buenos Aires, Guillermo Kraft, 1943, pp. 22-24. Alejandro Bunge uses the phrase *desequilibrio economico* to describe the population distribution in Argentina, and views the tendency of immigrants to settle in the city as having contributed to this disequilibrium. See his *Ochenta y cinco años de inmigración. Revista de Economía Argentina*, January, 1944, Vol. 43, p. 65. Brazil has undertaken legislation forbidding the foreigner who enters as a rural laborer to abandon the countryside within five years, the penalty being a fine and exportation; immigration is viewed as having in the past simply exaggerated a regrettable tendency toward urbanization. See Brasil, Conselho de Imigração e Colonização, *ANTE-PROJECTO DE LEI SOBRE IMIGRAÇÃO*. Rio de Janeiro, Imprensa nacional, 1943, pp. 39, 74, 148-149. Boero Brian, Jorge Justo, and Molina Serrano, Francisco: *ENSAYO SOBRE LA EVOLUCIÓN DE LA POBLACIÓN DE LAS AMÉRICAS*. Vol. II, *Argentina*, Montevideo, 1946, p. 20, view cityward immigration as a manifest danger.

<sup>13</sup> Davis, Kingsley and Casis, Ana: *URBANIZATION IN LATIN AMERICA*. New York, Milbank Memorial Fund, 1946, pp. 15, 31-32. T. Lynn Smith, *op. cit.*, pp. 199-200. Bunge, Alejandro: *Ochenta y cinco años de inmigración, loc. cit.*, p. 65. Boero and Molina, *op. cit.*, p. 39.



urbanized, with an accompanying high standard of living, its potential emigrants are effectively discouraged from accepting peonage on a plantation or subsistence on a remote insect-ridden farm.<sup>14</sup> It is not that the pioneer spirit is dead. It is as latent as ever, but the conditions required for evoking it are gone. The open spaces of Latin America, so often mentioned in connection with potential immigration, so fondly wished off on the foreigner, are unable to attract a mass migration from Europe. They are slowly and haltingly being settled,<sup>15</sup> but more by the expansion of old settled areas than by the importation of aliens. The common belief in Latin America that the hinterlands can be settled by the simple process of bringing over masses of European immigrants and placing them on the land is a myth that never was strictly true for this region, and certainly is not true today.<sup>16</sup>

#### THE NEW ORIENTAL EXCLUSION

It will be noticed that the discussion so far has centered on European immigrants. What is true of them is not necessarily true of others. There are literally hundreds of millions of Asiatics who, under conditions far less favorable than those being proposed, would be willing to migrate to new territories in Latin America, especially the tropical parts so difficult for Europeans.<sup>17</sup> But the Oriental exclusion policy of the United

<sup>14</sup> For the general theory of modern European migration, see Forsyth, W. D.: *THE MYTH OF THE OPEN SPACES*. Melbourne, Melbourne University Press, 1942, Chaps. 3, 6. Also Hutchinson and Moore, *op. cit.*, and Moore, Wilbert E.: *Economic Limits of International Resettlement*. *American Sociological Review*, April, 1945, Vol. 10.

<sup>15</sup> Rasmussen, Wayne D.: *Brazil's Advancing Frontier*. *Land Policy Review*, October, 1941, Vol. 4, pp. 18-24. Preston James, *op. cit.*, pp. 5-6.

<sup>16</sup> It has not been true of the United States. "The European immigrant was not a frontiersman. By neither experience nor instinct was he equipped to battle with forest or prairie. . . . Day by day, in spite of ceaseless toil, the woods grew thicker and the plains became wider, until the newcomer, seized with despair, confessed defeat by deserting to the city slum or the laborers' camp. No attempt to found a colony of foreigners on the edge of the wilderness ever succeeded. . . . Yet this was exactly the environment in which the native Westerner could thrive." Hansen, Marcus Lee: *THE ATLANTIC MIGRATION, 1607-1860*. Cambridge, Harvard University Press, 1941, p. 14.

<sup>17</sup> Radhakamal Mukerjee cites Latin American areas as among those parts of the world inadequately exploited and hence capable of receiving heavy Asiatic immigra-

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States and Canada has now been taken over by the Latin American republics. Brazil prefers that only "white" persons shall be admitted as immigrants,<sup>18</sup> and its quota system operates in that direction. Guatemala forbids not only Negroes and Gypsies, but also the entrance of persons of Mongolian race! Bolivia excludes, in addition to Jews and Negroes, the Chinese. Other countries express similar attitudes.<sup>19</sup> The resistance to Asiatics springs apparently from the fifth-column activities of the Japanese colonies in Brazil and Peru,<sup>20</sup> from the impression made by the Indian indentured laborers brought to British and Dutch possessions in the Caribbean area between 1840 and 1917, and from the competitive advantages gained by Chinese merchants in Panama, Cuba, and other countries. The whole world has been manifesting an increasing tendency to exclude Asiatics, as North America, Africa, and even Asia itself indicate.<sup>21</sup> Latin America is therefore merely following a global trend. There are still about 400,000 Asia-born persons in the region, and perhaps a million of Asiatic descent.<sup>22</sup> The present

tion. *MIGRANT ASIA*. Rome, Tipografia Failli, 1934, especially pp. 264-266. Warren S. Thompson points out that the population increase in India, China, and Japan combined could easily reach 175 million per decade. "There is much evidence that all these people make good pioneers under conditions which are quite impossible to Europeans. They can settle on new land in the tropics and thrive in much the same way as the Europeans did in North America and elsewhere in the temperate climates when they left what seemed to them crowded Europe." *POPULATION AND PEACE IN THE PACIFIC*. Chicago, University of Chicago Press, 1946, p. 323.

<sup>18</sup> *Ante-projeto de lei sobre imigração e colonização*, p. 22. See also, report of first Brazilian Economic Conference, Rio de Janeiro, December 18, 1943, mentioned in *International Labour Review*, March, 1944, Vol. 49, p. 362.

<sup>19</sup> Zorraquin, *op. cit.*, pp. 55-56.

<sup>20</sup> Normano, J. F. and Gerbi, Antonello: *THE JAPANESE IN SOUTH AMERICA*. New York, John Day Co., 1943. Hauser, Henri: Japanese Immigration in Brazil. *New Mexico Quarterly Review*, February, 1942, Vol. 12, pp. 5-17. Even after the end of the war, as late as 1946, the secret societies of the Japanese in Brazil continued to terrorize and assassinate those of their fellows who admitted Japan's defeat. Recommendations were made after numerous terroristic acts that either Hirohito or President Dutra send an official declaration to the Japanese in Brazil that the war is over. *New York Times*, July 31 and August 4, 1946. See also Nieves Ayala, Arturo: *EL PERÚ Y LA INMIGRACIÓN DE POSTGUERRA*. Lima, 1946, pp. 60-61.

<sup>21</sup> There has been considerable reaction against Indian immigrants in Burma and Malaya, against Chinese in Malaya and Java, and against Japanese nearly everywhere. Gyan Chand, an Indian himself, concludes that the Indians have nowhere to go. *INDIA'S TEEMING MILLIONS*. London, Allen and Unwin, 1939, pp. 291-295.

<sup>22</sup> The extent of past Asiatic immigration into Latin America seems not to be

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tenor of opinion indicates that in the future the number of Asiatic immigrants will be small indeed.

Thus the Latin Americans, still nourishing illusions about the nature and volume of possible European immigration, are erecting bars against the one kind of immigrants most likely to serve as laborers on the estancias and pioneers in the tropical frontiers.

#### NATIONALISM AND IMMIGRATION POLICY

The exclusion of orientals, however, is but one aspect of a far-reaching change of immigration policy that has come over the Latin American nations—a change connected with the whole evolution of these countries in recent times. We may call this final stage in immigration policy the nationalistic phase. The two earlier stages were the exclusionist policy of colonial times, lasting throughout the period of foreign control, and the pro-immigration policy, lasting from the Wars of Independence to about 1930.

During the colonial period, as is well known, both Spain and Portugal followed a monopolistic imperial policy, which had two sides to it. On the one hand it gave special advantages to one type of immigrant—the person born in the Peninsula. He was a “national” in a peculiar sense, a special citizen of the colonial world who was privileged to hold government positions and claim economic benefits forbidden to the creole. It was a

generally realized. According to data collected and estimated in the Office of Population Research, approximately 550,000 Indians migrated to Latin America between 1834 and 1937, and of these about 400,000 remained in their new home. Most of these Indians settled in British and Dutch possessions. The Chinese had a wider distribution, but probably a smaller number. During the period of World War I, when she was furnishing sugar for the Allied nations, Cuba admitted some 150,000 Chinese, according to Corbitt, Duvon C.: *Immigration in Cuba. Hispanic American Historical Review*, May, 1942, Vol. 22, p. 307. Probably no other Latin American nation has taken as many Chinese immigrants as Cuba, but they are found to some extent in nearly every country. The Japanese are more concentrated than either the Indians or Chinese, having come primarily to Brazil and Peru. “Approximately 200,000 Japanese immigrants have been legally admitted to Brazil since the first contingent of about 800 arrived in 1908. Those who should know believe that many more have entered the country illegally. . . . To many it will come as a distinct shock to see that Japan ranks fourth, ahead of Germany, as a contributor of immigrants to Brazil. . . . In the fifteen years preceding Pearl Harbor, Japan sent as many immigrants to Brazil as did Germany in her whole history.” T. Lynn Smith, *op. cit.*, p. 278.

policy that favored the immigrant as against the native-born.<sup>23</sup> At the same time, the colonial system, especially of the Spaniards, was one of rigid exclusion of the foreigner. It aimed at a complete monopoly of trade, religion, and population for the mother country. It therefore excluded all other immigrants except those from the Peninsula itself.<sup>24</sup> Its one great loophole, of course, was slavery, and it seems safe to conclude that during the colonial period more Negroes came to the Latin American region than non-Peninsular Europeans. The net effect of the colonial policy, therefore, was to set a special foreign class against a native class, to limit severely the total volume of free immigration, and to introduce into the population a large number of Africans.

The break with this policy came soon after the Wars of Independence in the first half of the nineteenth century. Freedom of trade, freedom of speech, freedom of democratic institutions all came quickly as a reaction to the restrictions of the past. The movement to abolish slavery got under way at once, and it extended even to the areas that remained colonial under the French, British, and Dutch. The new nations, feeling that they needed labor to replace the slaves, settlers to populate the land, capital to prime the economic pump, and ideas to overcome the colonial isolation, threw open their doors to immigration. They granted aliens the same rights as citizens, and in many cases even more. The Argentine constitution of 1853, for example, inspired by Alberdi's famous dictum that "in South America to govern is to populate," was so liberal that the foreign-born were in a better position than the citizens, because they had all the advantages that the latter enjoyed and yet were exempt from certain obligations, like military service, that weighed

<sup>23</sup> Ots, José M.: *INSTITUCIONES DE LA AMERICA ESPAÑOLA EN EL PERIODO COLONIAL*. La Plata, Universidad de La Plata, 1934, Chap. 2. Chapman, Charles E.: *COLONIAL HISPANIC AMERICA*. New York, The Macmillan Co., 1933, Chap. 7.

<sup>24</sup> Irizarry y Puente, J.: *Exclusion and Expulsion of Aliens in Latin America*. *American Journal of International Law*, April, 1942, Vol. 36, pp. 252-254. Chapman, *op. cit.*, pp. 31-32, 109-110, 129-130, 151, 157. Davie, Maurice R.: *WORLD IMMIGRATION*. New York, The Macmillan Co., 1936, pp. 445-446. Needless to say, the Spaniards were more successful in the policy of exclusion than were the Portuguese.

upon the natives.<sup>25</sup> In a way, despite the reaction against the colonial regime, there was a heritage from it. The natives, made up of Indians, ex-slaves, and creoles, long benighted by colonial provincialism, were the barbarians; the European immigrants were the civilizers. Hence the emphasis was not so much on assimilation of the stranger as on assimilation of the native. The immigrant enjoyed a maximum of advantages, and maintained a certain superiority in place of the stigma ordinarily attaching to the stranger.<sup>26</sup> He often began or soon climbed high up in the economic ladder. He was often connected with foreign economic interests.

The new policy, risky for new and weak nations, at first had little success in attracting immigrants. Political and economic conditions were so unstable that not many Europeans were ready to gamble. Not until the 1870's did the real current of immigration get started.<sup>27</sup> From that time on, however, the flow was substantial. For example, during the thirteen years prior to 1870 in Argentina, only 88,000 net immigrants were recorded, but during the twenty years thereafter, 743,000 were registered, and the next twenty years (1890-1910) saw 1,440,000 come in. To judge by those countries for which statistics are available, the peak of immigration to Latin America occurred between 1900 and 1914. This was the peak period in the movement of Europeans to all parts of the world.<sup>28</sup> After the slump caused by World War I there was another but lesser peak in the 20's, followed by a prolonged slump during the depression and World War II. The changes in volume of immigration were not primarily due to variations of immigration policy, but to economic and political conditions in both Europe and America. The immigration policy throughout the entire

<sup>25</sup> Bunge, Alejandro E. and Garcia Mata, Carlos in Willcox, Walter F. (Ed.): *INTERNATIONAL MIGRATIONS*. New York, National Bureau of Economic Research, 1931, Vol. II, p. 147.

<sup>26</sup> Zorraquin, *op. cit.*, pp. 13-14.

<sup>27</sup> Davie, *op. cit.*, p. 446.

<sup>28</sup> Ferenczi, Imre in Willcox, Walter (Ed.): *INTERNATIONAL MIGRATIONS*. New York, National Bureau of Economic Research, 1929, Vol. I, p. 183.

century from 1830 to 1930 remained dominantly laissez-faire. It did reserve the right to forbid entry to certain types of persons, but the grounds of exclusion were chiefly concerned with health and public relief, not with the questions of assimilation, political allegiance, economic competition, etc. It reserved the right to expel the transient alien for cause, but not the domiciled alien.<sup>29</sup> On the positive side, it offered encouragement in many ways. It allowed private associations and companies to recruit immigrants, pay their steamship fare, and give them good contracts and working conditions. It fostered good treatment of immigrants, economically and socially, for they tended without hindrance or prejudice to climb the social ladder rapidly, and they experienced little or no restraint on practicing their own customs and adhering to their own nationality groups. They could settle where they wished, and could move freely. If anything, the very fact that they were foreigners seemed somehow to give them advantages.<sup>30</sup>

A reaction to the laissez-faire immigration policy was inevitable. It came as a consequence of the following: (1) the great influx of foreigners under the laissez-faire policy; (2) the concentration of these foreigners in particular areas; (3) their resistance to assimilation; and (4) their economic and social success. The historical setting in which these factors expressed themselves and became acute included, of course, the depression of the 1930's, World War II, and the maturation of the nations to the south. The result was a somewhat abrupt change of immigration policy from one of generous welcome to one of nationalistic caution. The constitutions prior to 1930

<sup>29</sup> Irizarry y Puente, *op. cit.*, pp. 254-256.

<sup>30</sup> T. Lynn Smith, *op. cit.*, p. 294, points out that each of the major foreign-born groups in São Paulo is more heavily represented among the farm proprietors than among the rural population generally. The Italians, for instance, owned in 1934 no less than 12.2 per cent of the farms although they comprised only 3.9 per cent of the rural residents. "Even the Japanese, most of whom had immigrated in the decade preceding the census, owned 5.1 per cent of the farms, although they made up only 3.0 per cent of the rural population. Farms owned by foreigners were smaller than those of the native proprietors, but on the other hand they contained a disproportionately large share of the state's cultivated land. They also were more valuable, in relation to their number, than the farms owned by Brazilians."

constituted a stumbling block to the new policy, because they often had written into them clauses favorable to immigration and to immigrants. But many of the old constitutions have been replaced by new ones, and these either embody a change of attitude toward foreigners or else leave the handling of the matter to specific legislation.<sup>31</sup> In any case, the change of policy as seen in the recent legal structure is quite sharp.

The main features of the new policy can be summed up under two headings: first, the admission of foreigners; second, the treatment of them once they are admitted. In each case the underlying philosophy is one of protection and enhancement of the state as an integral unit, and favor for its citizens as against the foreigner.

*Admission of Immigrants.* So far as admission is concerned, the first thing to notice is that the new and more restrictive attitude turns upon the question of assimilability. Whereas the old law took rapid assimilation for granted, or else implied that the immigrants would assimilate the natives, the new law assumes that only certain races, ethnic groups, or nationalities are capable of assimilation in the country concerned. Colombia, which in 1920 had declared in its immigration law that "the territory of Colombia is open to all foreigners," was in 1937 saying that "Bulgarians, Chinese, Egyptians, Esthonians, Greeks, Hindus, Latvians, Letts, Lebonese, Lithuanians, Marocans, Palestinians, Poles, Roumanians, Russians, Syrians, and Turks," could come in only if they had complied with a series of requirements difficult to fulfill, among them the presentation of a certificate of conduct covering a period of 12 years and the deposit of 1,000 Colombian pesos. Gypsies, independent of their nationality, could not enter at all.<sup>32</sup> In general the entrance of Asiatics, as mentioned above, and of Africans is categorically forbidden, but restrictions may also be placed on Europeans of particular kinds. Peoples of Latin culture,

<sup>31</sup> Zorraquin, *op. cit.*, pp. 24-25, Boero and Molina, *op. cit.*, p. 35.

<sup>32</sup> Zorraquin, *op. cit.*, pp. 52-53. The stringency of some of these laws has been modified since the end of the recent war.



especially those who speak the same language as the nation concerned, are likely to be favored, while others are discouraged. The Jews are, for the most part, discriminated against indirectly (through ambiguous laws capable of double interpretation, through unannounced instructions to consular officials, or through a quota system).<sup>33</sup> Three countries—Brazil, Peru, and Mexico—have quota schemes. The Brazilian system, limiting immigrants from any nation to 2 per cent of those entering from that nation during 1884–1933, accomplishes an ethnic selection as well as a quantitative limitation.<sup>34</sup> The Peruvian system is simply a quantitative limitation (2 per mil of the total population), and the Mexican is flexible from year to year.<sup>35</sup> Argentina established in 1946 an *Instituto Etnico Nacional*, one function of which is to study the kinds of immigrants who should be admitted.<sup>36</sup>

The restrictions on admission sometimes include occupational requirements. The desire to have immigrants become farmers or estate laborers leads to a preference for agriculturalists as against other occupational types. Paraguay, for example, divides immigrants into two classes, privileged and unprivileged. The first includes agriculturalists, artisans, and such industrialists as have 1,500 pesos (or only 500 if they promise to settle in a rural area). The second includes members of the liberal professions and white-collar classes, who receive none of the benefits of the immigration law and require special permission to enter.<sup>37</sup> Brazil requires that 80 per cent of each quota be reserved for persons concerned in some way with agriculture.<sup>38</sup> Most other countries, though not this direct,

<sup>33</sup> Zorraquin, *op. cit.*, pp. 66–69, has an account of Jewish-exclusion methods.

<sup>34</sup> Brasil, Imigração e Colonização, *Decreto-Lei* No. 7, 967–18–9–45 Rio de Janeiro, Imprensa Nacional, 1945, p. 3. The quota of any nationality may be raised to 3,000 for good reason.

<sup>35</sup> Zorraquin, *op. cit.*, pp. 59–65.

<sup>36</sup> Constanzó, María de las Mercedes: La Antropología y el problema de la población en Argentina. *Acta Americana*, July–September, 1946, Vol. 4, pp. 154–160.

<sup>37</sup> Zorraquin, *op. cit.*, pp. 49–50.

<sup>38</sup> *Ibid.*, p. 71.



favor cultivators and field workers more than persons practicing other occupations.

*Treatment of Immigrants.* Legally, the foreign-born resident of a Latin American country no longer has a status equal to that of the citizen. He is subject to certain requirements and limitations that the native escapes. He is, or at least was during the war, likely to be placed under moderate surveillance, e.g., required to carry a card of identification and to keep the authorities notified of his address and his occupation. Ecuador stipulates, for example, that "no foreigner can change his occupation without authorization from the Office of Immigration." Brazil requires that a person entering under the system of directed immigration, contracting to undertake a particular occupation, cannot change this occupation during the period of the contract except by permission of the competent authority.<sup>39</sup> In most countries the non-citizen has been forbidden the privilege of political expression. Ecuador, for example, prohibits (or did prohibit) foreigners from associating to discuss political matters, either internal or external, or to draw up petitions or mix in popular elections. Perhaps more important is the prohibition, now frequent, on a foreigner being employed in government enterprise or public utilities. With more and more of the economic life coming under government control in these countries, exclusion from such employment is a serious economic limitation.<sup>40</sup> But economic restriction does not end there. The same nationalism that reserves public positions solely for citizens is also moving toward the removal of private industry from foreign control. The foreigner's chance to exploit natural resources and to engage in business is now either forbidden or limited. If not forbidden, a percentage of the employees must often be natives. Thus the application of nationalism in business—born of depression, war, and foreign abuse—conduces to a restrictive immigration policy. In addition, certain occupa-

<sup>39</sup> *Decreto-Lei* No. 7, 967-18-9-45, *loc. cit.*, p. 8. For a summary of the surveillance laws, see Zorraquin, *op. cit.*, pp. 69-73. It can be assumed that most of these have already been relaxed or will be relaxed as a result of peaceful conditions.

<sup>40</sup> Zorraquin, *op. cit.*, pp. 76-88.

tions, by virtue of their influence on public opinion or their lucrativeness or prestige, are now being forbidden or restricted in some quarters so far as foreigners are concerned. Among these are journalism, teaching, banking, insurance, the merchant marine, medicine, and law.<sup>41</sup>

#### IMMIGRANTS WANTED BUT NOT NEEDED

It becomes clear that since 1930 a new nationalism, a new self-sufficiency and resentment of outside intrusion, has led to policies that must discourage large-scale migration into Latin America. But this does not mean that immigrants are not desired. Nearly all countries in South America and some in Central America are looking for settlers, and are ready to offer active encouragement in one form or another. The recent policies are not intended to curtail migration, but simply to select and control it in the national interest. Assuming that they can get the kind of individuals they want, and can assimilate them after they arrive, the Latin American republics are ready to absorb millions of strangers.

There is consequently emerging at the present time a new phase of nationalistic immigration policy. Instead of emphasizing national interest through restriction, as was done during the depression and the recent war, the republics are stressing national interest through the promotion of selected immigration. This phase is so recent that assessing or keeping abreast of it is difficult. Some of the restrictive laws cited above are certainly being modified, and will be modified more after a time. There seems no likelihood, however, that the countries to the south will return to the old *laissez-faire* policy, or that they will forget the questions of assimilation, ethnic status, economic competition, foreign domination, and national security in choosing their immigrants. The newest phase of policy still places its emphasis on the immigration of farm workers and colonists, still looks to Europe as a source, and still leaves unsolved the thorny economic problems associated with immigration (especially of Europeans) in the modern world. Above all

<sup>41</sup> *Ibid.*, pp. 93-127.

it is still trying to have selected immigration and mass immigration at the same time, and is still confusing the purpose of increasing its population with that of building its economy.<sup>42</sup>

Why this continued preoccupation with immigration? Perhaps part of the answer is simply the hangover of old ideas. Another part seems to be the desire of vested interests for cheap but efficient labor. A third, and perhaps the most important part, is a simple illusion or fallacy. The average Latin American contemplates the empty spaces of his country and jumps to the conclusion that they are not economically exploited *because* they are sparsely settled. He reasons that if his country can bring in a large number of immigrants, it will then be able to exploit its vast undeveloped areas and will become rich thereby. Such reasoning, however, places the cart before the horse. It is as true to say that the population of the Latin American hinterlands is sparse because lands are not economically exploited, as to say the reverse. If the economic and social institutions of the original settlers had encouraged thrifty agriculture, a productive industry, and a low mortality, their natural increase and their attraction of immigrants would long since have filled up the favorable areas. Instead a regime of large estates, peon labor, non-productive expenditure, and fixed social classes did not operate to produce the capital and enterprise necessary for adequate exploitation. The tendency was to rely on cheap labor to do what in other frontier regions was done by machinery and advanced technology.<sup>43</sup> It follows that the remedy today is not more people, but a new economic and social orientation. To acquire more people without having the latter is to create problems rather than solve them.

If people were all that is needed to fill Latin America's open spaces, they could be supplied from the region's phenomenal natural increase. Many Latin Americans and Latin American

<sup>42</sup> A good illustration of the current trend is Nieves, *op. cit.* See also Boero and Molina, *op. cit.*, pp. 35-36.

<sup>43</sup> The history of rubber is a case in point. See Zimmermann, Erich W.: Resources in Latin America, in *SOME ECONOMIC ASPECTS OF POST-WAR INTER-AMERICAN RELATIONS*. Austin, University of Texas Press, to be published soon.

experts do not seem to realize, when they recommend immigration, that the population of the area is growing faster than that of any other major region in the world today. With a 1946 population of approximately 146 million, it has overtaken the United States, which now lags behind by about 6 million.<sup>44</sup> During the twenty years from 1920 to 1940 the number of people increased at an average rate of approximately 1.73 per cent per year, and the region added approximately 40 million, or about 41 per cent, to its population. The rate of increase today is more than double that of the world as a whole. If it continues the population will be twice as large in 1986 as it is today, for it is doubling every 40 years; and by the year 2000 it will reach over 373 million.

Actually the natural increase has been so large that the stream of migration after 1870, large as it seemed, contributed only a small percentage to the total population growth. In Brazil, for example, it is said that only about 10 per cent of the population growth after 1890 was contributed directly by migration.<sup>45</sup> In Argentina the contribution was approximately 30 per cent.<sup>46</sup> These were the countries with the heaviest immigration. The rest of the region received nothing like this proportion of its population growth directly from overseas. Its rapid expansion of population has been predominantly a function of natural increase, and there is every sign that this source of supply will be increased rather than decreased in the next two or three decades,<sup>47</sup> especially since the native population is now so much larger than previously.

The major subregions of Latin America seem to be growing at roughly the same rate of speed. At least one of them, the

<sup>44</sup> See Davis, Kingsley: *Population Trends and Policies in Latin America, in SOME ECONOMIC ASPECTS OF POST-WAR INTER-AMERICAN RELATIONS*. Austin, University of Texas Press, to be published soon.

<sup>45</sup> Smith, *op. cit.*, p. 159.

<sup>46</sup> Bunge: *Ochenta y cinco años de inmigración*, Part I, *loc. cit.*, pp. 31-32; *Nuevo Argentina*, p. 96. In Boero and Molina, *op. cit.*, pp. 17-18, the indirect effects due to the natural increase of the immigrants in the new country are discussed.

<sup>47</sup> For some time to come death rates will probably decline faster than birth rates. See Kingsley Davis: *POPULATION TRENDS AND POLICIES IN LATIN AMERICA, loc. cit.*

Caribbean islands, is already showing signs of serious overpopulation. At its present rate of growth, the current population of 14 million will grow to 26 million by 1970, with a density of 290 per square mile, and will reach 50 million by 2000, with a density of 547. The density of Puerto Rico is already more than 550. The Caribbean islands form an area of emigration rather than of immigration, and this tendency will doubtless become stronger. This subregion can therefore furnish the rest of Latin America with many immigrants if conditions are made right.

It is easy to exaggerate the amount of land that is open to settlement in Latin America, and to underestimate the importance of ready markets, technological advance, social institutions. Mexico, with some 22 million people, is pressing hard, in terms of its economy, upon the available land, and is constantly exerting migratory pressure on the American border. It is a typical case of a high pressure area adjoining a low pressure area, with only a political border between the two. In this sense, then, Latin America is, at least in part, an area of out-migration rather than in-migration. Under certain conditions it might become much more so.

The current Latin American demand for heavy overseas immigration seems, therefore, to be based largely on illusion. It assumes that there are open spaces the development of which awaits only more people. It forgets that the current and future natural increase of the region itself is phenomenally great, and capable of filling very heavy population demands; that certain subregions, being already thickly peopled in relation to resources, are tending to be areas of out-migration; that past immigration has not contributed a great percentage to population increase or filled the open spaces; and finally, that Europe is now greatly urbanized and demographically stationary, so that it does not have large numbers of agriculturalists to send to South America.

#### CONCLUSION

The conclusion seems inescapable that, despite the desire for

immigrants, Latin America will not receive a great deal of immigration in the future. In so far as Europeans leave their homelands, they will probably go not into agriculture but into new industrial areas. In Latin America the new nationalistic immigration policy, undertaking to select the people allowed to enter and to control them after they enter, is likely to discourage many who otherwise might come to this region. Also, the demands of a growing population in Latin America may make it hard for persons from overseas to gain any advantage by coming.

Doubtless there will be some immigration, much of it from Europe. The restrictive policies born of the depression and the war are already relaxing. Temporary conditions in Europe may favor departures. A postwar peak of immigration may be reached. But mass immigration, such as occurred in the past, is not at all likely. The only chance of mass immigration into this region would seemingly depend on one of two alternate circumstances. Either world conditions would get so chaotic that an invasion of land-hungry peasants from Asia would be possible, or a strong world government would decide to remedy the imbalance of population as between the continents and would bring hundreds of millions of Asiatics to the Americas. Both of these alternatives plainly relate to Asia. Asia, not Europe, is the modern source of mass migration, but one that Latin America is likely to stave off, at least for a good while, and perhaps until she has, by her own natural increase, filled her territory with three or four times its present population.

What is said here concerns mass immigration, and does not apply to small but often highly useful migratory currents. Any country, for example, can use persons above the average in training and capacity; and the industrialization program in the republics could profit by their entry. But the number of such persons who want to migrate is small indeed, and they are sought after by all the new industrial regions. Latin America must rely mainly on her own educational systems to provide trained personnel, sending large numbers of students to foreign

countries as a temporary expedient. The need for specific types of personnel and services can be met, perhaps, by short-term, controlled migration schemes. These would presumably be two-way affairs, furnishing an opportunity to give Latin Americans employment abroad as well as foreigners employment in Latin America. In both cases they can have a stimulating effect on the economic development of the region, as well as a beneficial effect on international understanding.

The real question, so far as this paper is concerned, is the desirability of masses of unskilled immigrants. The answer is that they are not needed, that the fundamental problem in Latin America is not lack of people, but lack of skills and capital. Some immigration is likely, possibly of a beneficial sort, but so far as mass immigration is concerned we must end with the brief epitome of the situation as stated at the beginning: The region cannot attract the kind of immigrants it wants and does not want the kind it can attract; and also it does not need mass immigration anyway.



## SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY

### VI. THE PLANNING OF FERTILITY<sup>1</sup>

P. K. WHELPTON AND CLYDE V. KISER

**A**LTHOUGH it is generally believed that attempts to plan the number and spacing of children are much more common now than formerly among urban married couples, little accurate information is available regarding the proportion of such couples that are involved, nor the results which they achieve. How many try to postpone the first pregnancy until the desired date? How many begin with the second pregnancy, the third, etc? And how many never try to control family size and spacing? What proportion of each group is low in fecundity or completely sterile? Of the fecund couples who try to plan their pregnancies, how many are completely successful in their efforts, partially successful, unsuccessful? How do they compare in number of children? What are the desired intervals between marriage and the first child, the first and second, etc.? Do the various planning groups differ in the physiological ability to bear living children? How much has the birth rate been depressed by the efforts of fecund couples to plan family size? What would happen to this rate if all attempts at family planning were successful?

Partial answers to the foregoing and related questions can be obtained from the data collected in the Study of the Social and Psychological Factors Affecting Fertility. As brought out in previous articles in this series, schedules were completed for 1,080 Indianapolis couples who met certain demographic, religious and educational requirements<sup>2</sup> and who should be

<sup>1</sup> This is the sixth of a series of reports on a study conducted by the Committee on Social and Psychological Factors Affecting Fertility, sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The Committee consists of Lowell J. Reed, Chairman; Daniel Katz; E. Lowell Kelly; Clyde V. Kiser; Frank Lorimer; Frank W. Notestein; Frederick Osborn; S. A. Switzer; Warren S. Thompson; and P. K. Whelpton.

<sup>2</sup> Husband and wife native white; both Protestant; married in 1927, 1928, or  
(Continued on page 64)

typical of a large proportion of our urban population. Of these 1,080 couples, 860 are classified as "relatively fecund" and 220 as "relatively sterile." The latter group includes all couples with three or fewer live births who knew (or had good reason to believe) that they were sterile during a period of at least 24 or 36 consecutive months.<sup>3</sup> Other couples are considered "relatively fecund." Because of the sampling procedure utilized, the 860 "relatively fecund" couples for whom schedules were completed are believed to be representative of the 1,444 "relatively fecund" (and apparently cooperative) couples who were found in the first stage of the field work. For the same reason the 220 "relatively sterile" couples for whom schedules were completed are believed to be representative of 533 "relatively sterile" couples.<sup>4</sup> This analysis is based on the 1,977 couples in the inflated sample, the data for the additional 584 "relatively fecund" and 313 "relatively sterile" couples being obtained by duplicating on a random basis the punched cards for some of the couples in the sample.

#### A. THE FREQUENCY AND SUCCESS OF ATTEMPTS TO PLAN FERTILITY

For the large majority of couples the problem of how to plan fertility is the problem of how to space the pregnancies wanted and prevent those not wanted. From this standpoint methods of planning fertility can be classified logically into three broad

1929; wife under 30 and husband under 40 at marriage; neither previously married; residents of a large city most of the time since marriage; and both elementary school graduates. See Whelpton, P. K. and Kiser, Clyde V.: Social and Psychological Factors Affecting Fertility. IV. Developing the Schedules, and Choosing the Type of Couples and the Area to be Studied. *The Milbank Memorial Fund Quarterly*, October, 1945, xxiii, No. 4, pp. 386-409. (Reprint, pp. 139-162.)

<sup>3</sup> A period of twenty-four months was used in classifying never pregnant couples and one of thirty-six months for others. In the absence of more positive information, coitus without some form of contraception "always" or "usually" and not resulting in pregnancy was considered an adequate reason for classifying a couple as "relatively sterile." Sterility includes the lack of ability to deliver a live born child, as well as the lack of ability to conceive.

<sup>4</sup> Whelpton, P. K. and Kiser, Clyde V.: Social and Psychological Factors Affecting Fertility. V. The Sampling Plan, Selection, and the Representativeness of Couples in the Inflated Sample. *The Milbank Memorial Fund Quarterly*, January, 1946, xxiv, No. 1, pp. 49-93. (Reprint, pp. 163-208.)

groups, (1) abstaining from coitus, (2) preventing coitus from resulting in conception, and (3) aborting intentionally and for nontherapeutic reasons. Among the couples under consideration the first and third groups are unimportant both absolutely and relatively. Only fifty-eight of the 1,977 couples (2.9 per cent) reported abstinence,<sup>5</sup> only nine couples abstained for more than six months at a time (unless because of sickness or separation), and the total duration of abstinence was less than 0.1 per cent of the months when contraception was practiced. Illegal abortions were reported by only thirty-six couples (1.8 per cent), and the total number of such abortions was only eighty-seven, or 2.3 per cent of the number of pregnancies.<sup>6</sup> The second group, in contrast, is large, for 1,764 of the 1,977 couples reported that they had tried in various ways to prevent coitus from leading to conception.<sup>7</sup> In addition, seventeen wives who were "relatively fecund" and twenty-seven who were "relatively sterile" insisted they had done nothing to lessen the probability of conception, although they admitted having douched merely "for cleanliness" immediately after coitus.<sup>8</sup>

<sup>5</sup> The percentage for the 1,444 "relatively fecund" couples is 3.1.

As used in this study abstinence means that coitus did not occur during a period of a month or longer for reasons other than illness or physical separation. The minimum period was set at one month because there is evidence indicating that a majority of women ovulate at intervals of approximately one month.

<sup>6</sup> Fifty illegal abortions were reported by thirty (2.1 per cent) of the "relatively fecund" couples. One of the "relatively sterile" wives said she had paid a "physician" to perform sixteen "illegal abortions."

While it is believed that most of the illegal abortions which occurred were reported to the interviewers, it is probable that a few were concealed in spite of the interviewers' attempts to ferret them out when their suspicions were aroused by apparent inconsistencies between the replies to various questions. For further discussion of this matter see Whelpton, P. K.: "The Frequency of Abortion" in *THE ABORTION PROBLEM*. Baltimore, The Williams and Wilkins Co., 1944. pp. 15-17.

<sup>7</sup> Each couple that practiced abstinence or had an illegal abortion also tried to prevent coitus from resulting in conception.

<sup>8</sup> Because the belief that douching immediately after coitus will not reduce the likelihood of conceiving indicates a serious lack of knowledge of certain phases of reproduction, the interviewers were instructed to question such women carefully in order to make sure that they were not merely trying to avoid admitting that they practiced contraception. Only the women whose attitudes were unshaken were classified as not practicing contraception on a "motive" basis. Some of these women cited the family doctor as the source of their information regarding the lack of effect of a douche. It is probable, however, that "feminine hygiene" advertising is the main reason for this misunderstanding.

Table 1. Interpregnancy interval when contraception was first practiced on "motive" and "action" basis, by "relatively fecund" and "relatively sterile" couples.<sup>1</sup>

BASIS OF CONTRACEPTION, AND FECUNDITY STATUS	TOTAL	NEVER PRAC- TICED CONTRA- CEPTION	PRAC- TICED CONTRA- CEPTION	INTERVAL WHEN CONTRACEPTION FIRST PRACTICED						
				First	Second	Third	Fourth	Fifth	Sixth to Tenth	
				PERCENTAGE DISTRIBUTION						
"Motive" Basis										
"All Couples"	100.0	10.8	89.2	64.0	18.3	4.6	1.5	0.6	0.3	0.3
"Relatively Fecund" Couples	100.0	1.6	98.4	69.5	21.2	5.0	1.9	0.6	0.3	0.3
"Relatively Sterile" Couples	100.0	35.6	64.4	49.2	10.5	3.6	0.6	0.6	—	—
"Action" Basis										
"All Couples"	100.0	8.5	91.5	68.9	15.8	5.0	1.2	0.5	0.2	0.2
"Relatively Fecund" Couples	100.0	0.4	99.6	74.2	18.0	5.3	1.4	0.4	0.3	0.3
"Relatively Sterile" Couples	100.0	30.6	69.4	54.6	9.8	3.9	0.6	0.6	—	—
NUMBER OF COUPLES										
"Relatively Sterile" Couples										
"Motive" Basis	1,977	213	1,764	1,265	362	91	30	11	5	5
"All Couples"	1,444	23	1,421	1,003	306	72	27	8	5	5
"Relatively Fecund" Couples	533	190	343	262	66	19	3	3	—	—
"Relatively Sterile" Couples										
"Action" Basis	1,977	169	1,808	1,362	312	98	23	9	4	4
"All Couples"	1,444	6	1,438	1,071	260	77	20	6	4	4
"Relatively Fecund" Couples	533	163	370	291	52	21	3	3	—	—

<sup>1</sup> In determining "interpregnancy intervals" in this table, an adopted child is treated the same as a child born to the couple.

From the standpoint of their motives and intentions they may well have been correct in denying that they were practicing contraception, but from the standpoint of their actions it is altogether probable that they were interfering with conception to the same extent as other users of the same douches. On a "motive" basis, therefore, 89.2 per cent of these couples had tried to control their fertility by contraception during part or all of their married life; on an "action" basis 91.5 per cent had done so. The proportions are much higher among the "relatively fecund" couples (98.4 per cent on a "motive" and 99.6 per cent on an "action" basis), and much lower among the "relatively sterile" couples (64.4 per cent and 69.4 per cent respectively).

Over two-thirds of the "relatively fecund" couples and nearly half of the "relatively sterile" couples attempted to prevent or postpone the first pregnancy by means of contraception.<sup>9</sup> (See Table 1.) In addition, approximately 5 per cent of the "relatively fecund" wives and the same proportion of the "relatively sterile" wives did not intend to use preventive measures before their first pregnancy, but undoubtedly delayed it unwittingly by using a douche "for cleanliness only." Nearly all of the couples who tried to postpone the starting of their families began some type of contraceptive practice at marriage, though a small number waited a few weeks or even longer. Most of the "relatively fecund" couples who delayed their attempts at postponement had relatively little time in which to change their mind, for conception occurred without much delay. Some of the "relatively sterile" wives had a similar experience, but others found that they could not have a child for several months or years, if at all. Of the 712 couples who did not try to postpone the first conception, between 9 and 16 per cent had a premarital conception. Sixty-eight wives admitted they were pregnant when married, and forty-six others may have been, for the date on which the first pregnancy ended

<sup>9</sup> In the remainder of this discussion abstinence will be considered a form of contraception.

minus the reported length of the pregnancy gives a conception date one to twenty-nine days before marriage.

Between the first and second pregnancies (or between the first pregnancy and the interview), 21.2 per cent of the "relatively fecund" couples began to plan fertility through contraception. This raised the number of contraceptors in the group to 1,309, and the proportion from 69.5 to 90.7 per cent. In other words slightly over two-thirds of the "relatively fecund" couples tried to delay or prevent the first pregnancy, and nearly all of these and three-fourths of the others tried to do so with the second. Over half (72 of 135) of the couples who did not try to prevent or postpone either the first or second conceptions began to use contraceptives when coitus was resumed after the second pregnancy. Twenty-seven joined the group after the third pregnancy, leaving only thirty-six noncontraceptors. Subsequent pregnancies led thirteen additional couples to try to control family growth, and left only twenty-three who failed to do so among those classified as "relatively fecund." As mentioned earlier, however, only six of these had unrestricted fertility, for the other seventeen wives douched "for cleanliness only," that is, they practiced contraception on an "action" but not on a "motive" basis.

For many of the 271 "relatively sterile" couples who did not use contraceptives on a "motive" basis before their first pregnancy, the fertility planning problem was that of becoming able to conceive, rather than that of spacing or preventing pregnancies. One hundred three of these couples never had a pregnancy; they constitute over half of the non-contraceptors in the "relatively sterile" group. Thirteen additional couples conceived only after an abnormally long period of exposure, after being treated for sterility, or both. Most of them did not need to try to space or prevent the second conception; only two attempted to do so. Nearly all of the remaining 155 "relatively sterile" couples not using contraceptives before the first conception had no reason when the first puerperium ended to think the second conception would be unduly delayed, nevertheless,



only 54 of them (34.8 per cent) began contraception in the second interval. A still smaller proportion (16 of 104), of the "relatively sterile" couples who had not used contraceptives before the second pregnancy, and who did not think at the end of the second puerperium that they were low in fecundity or sterile, began attempts to control fertility during the third interval.

Why the percentages should be only 34.8 and 15.4 for these "relatively sterile" couples, but 69.4 and 53.3 for the corresponding couples in the "relatively fecund" group is puzzling. The differences could occur if (a) the early resort to contraception lessens the likelihood of low fecundity or sterility, (b) the characteristics or situations which lead to low fecundity or sterility are associated (before the end result is recognized) with characteristics or situations which are unfavorable to the use of contraception for spacing children or restricting family size, or (c) couples who are low in fecundity or sterile, who have fewer children than they want, and who use contraception while their fertility is normal, have a "guilt complex" about admitting the use of contraception (perhaps because some physicians claim that it causes sterility, or because some religious leaders claim that it is wrong), hence fail to report contraceptive practices to interviewers for such a study. Hypotheses a and b seem highly improbable and hypothesis c rather far-fetched. If subsequent studies show a similar relationship, however, these and other hypotheses should be explored further.

The number of "relatively fecund" couples resorting to contraception on a "motive" basis rose from 1,003 during the first interpregnancy interval to 1,180 during the second,<sup>10</sup> for a variety of reasons which will be analyzed later. There was a rapid decline after the second interval, however, primarily for the simple reason that many of the couples with one pregnancy never had a second, many with two never had a third, etc.

<sup>10</sup> "Interpregnancy interval" is used in this discussion to refer to the time between the last pregnancy and the interview as well as the time between successive pregnancies. For never-pregnant couples it means the interval from marriage to interview.



Table 2. "Relatively fecund" and "relatively sterile" couples practicing and not practicing contraception ("motive" basis) in each interpregnancy interval.

FECUNDITY STATUS AND BASIS OF CONTRACEPTION	INTERPREGNANCY INTERVAL					
	First	Second	Third	Fourth	Fifth	Sixth
<b>All Couples</b>						
Number	1,977	1,657	1,163	566	249	106
Percentage that:						
Thought Themselves Sterile Throughout Interval	0.2	0.8	1.7	0.5	2.0	3.8
Thought Themselves Fecund Part or All of Interval	99.8	99.2	98.3	99.5	98.0	96.2
Practiced Contraception	64.0	82.2	88.0	88.9	91.2	86.8
Did Not Practice Contraception	35.9	17.0	10.2	10.6	6.8	9.4
Did Not Douche "For Cleanliness Only"	31.0	14.1	8.0	8.5	4.8	6.6
Douched "For Cleanliness Only"	4.9	2.9	2.2	2.1	2.0	2.8
<b>"Relatively Fecund" Couples</b>						
Number	1,444	1,320	999	502	238	102
Percentage that:						
Thought Themselves Sterile Throughout Interval	—	—	0.2	—	1.7	3.9
Thought Themselves Fecund Part or All of Interval	100.0	100.0	99.8	100.0	98.3	96.1
Practiced Contraception	69.5	89.4	92.6	93.4	91.2	86.3
Did Not Practice Contraception	30.5	10.6	7.2	6.6	7.1	9.8
Did Not Douche "For Cleanliness Only"	28.8	8.2	4.9	4.2	5.0	6.9
Douched "For Cleanliness Only"	4.7	2.4	2.3	2.4	2.1	2.9
<b>"Relatively Sterile" Couples</b>						
Number	533	337	164	64	11	4
Percentage that:						
Thought Themselves Sterile Throughout Interval	0.6	3.9	11.0	4.7	9.1	—
Thought Themselves Fecund Part or All of Interval	99.4	96.1	89.0	95.3	90.9	100.0
Practiced Contraception	49.2	54.0	60.4	53.1	90.9	100.0
Did Not Practice Contraception	50.3	42.1	28.7	42.2	—	—
Did Not Douche "For Cleanliness Only"	44.8	37.4	26.8	42.2	—	—
Douched "For Cleanliness Only"	5.4	4.7	1.8	—	—	—

All but 11 of the couples who used contraceptives before the first pregnancy resorted to them before the end of the first puerperium,<sup>11</sup> and all but 19 of those who did so between the first and second pregnancies started again before the end of the second puerperium. Three of the eleven couples did not think the second conception would occur less than two to four months after the first delivery, and had not gotten around to resuming contraception. Seven couples wanted the second pregnancy as soon after the first as possible, in five cases because the first pregnancy ended in wastage, and in only two cases so that the children would be only a year or so apart. Of the nineteen couples who did not resume contraceptive practices between the second and third pregnancies, five thought (erroneously) that they had become sterile, three thought that conception would not occur so soon after delivery, seven wanted the third quickly because the second ended in wastage, and four had miscellaneous reasons (didn't know what method to try next, lacked money to buy supplies, etc.).

The proportion of "relatively fecund" couples using contraception jumped from 69.5 per cent during the first interval to 89.4 per cent during the second, reached 93.4 per cent during the fourth interval, declined to 83.3 per cent during the ninth interval, and then rose to 100 per cent for the few couples involved. (See Table 2.) The rise from the first to the fourth interval represents the additional couples who decided after the first, second, or third pregnancy that they should begin to try to restrict family size, or at least to space children. The decline from the fourth to the eighth interval results from the success of the efforts to prevent additional childbearing, for a rapidly decreasing number of couples practicing contraception in the fifth, sixth, and subsequent intervals had fifth, sixth, and higher order pregnancies, whereas those who had not begun contraception (or using a douche "for cleanliness only") kept on conceiving, or became sterile. (See Figure 1.)

The number of "relatively sterile" couples who utilized re-

<sup>11</sup> In this study it is assumed that the puerperium ends one month after delivery.

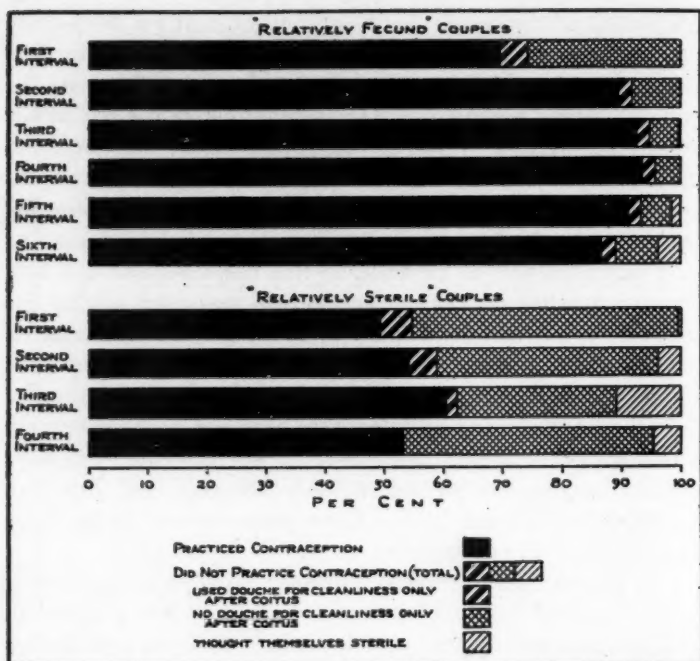


Fig. 1. "Relatively fecund" and "relatively sterile" couples practicing and not practicing contraception during specified interpregnancy intervals. (See Table 2.)

strictive measures was larger in the first interval than in any other. This is not surprising when it is remembered that only 337 of the 533 couples had a second interval, and only 164 a third. (See Table 2.) What may be surprising, however, is the fact that, as among "relatively fecund" couples, the proportion of "relatively sterile" couples practicing contraception during specific intervals tended to vary directly with the order of the interval, rising from 49.2 per cent during the first interval to 60.4 per cent during the third, and to virtual totality for the small number of fifth and sixth intervals that occurred. Two of the three main reasons for this relationship are the same as for the "relatively fecund" couples, namely, an increasing desire after each delivery either to prevent the next conception from

occurring too soon,\* or to prevent it entirely because the family was sufficiently large. The third reason—past experience indicated that the wife would have difficulty in carrying another foetus to term and bearing a living child—was limited almost entirely to the “relatively sterile” group.

When considering the extent to which couples resort to contraception, it is desirable to deal at the same time with the “relatively fecund” and “relatively sterile” couples, that is, to look at the population as a whole, as has been done so far. But in discussing the effectiveness of efforts to plan fertility, the relation between size of family and planning status, and related topics, it is helpful to center attention first on the “relatively fecund” couples, and postpone the evaluation of the influence of low fecundity or sterility. Accordingly, the remainder of this article will relate to the “relatively fecund” couples.

Table 3. Success of contraceptive efforts (on “motive” basis) of “relatively fecund” couples during each interpregnancy interval.<sup>1</sup>

SUCCESS OF CONTRACEPTION	INTERPREGNANCY INTERVAL					
	First	Second	Third	Fourth	Fifth	Sixth
<i>Number of Couples Practicing Contraception</i>	1,003	1,180	925	469	217	88
<i>Percentage:</i>						
Unsuccessful	50.6	47.4	37.4	39.7	41.5	44.3
Successful	49.4	52.6	62.6	60.3	58.5	55.7
Next Pregnancy Planned	38.0	26.8	10.5	6.4	0.9	—
Next Pregnancy Prevented	11.4	25.6	52.0	53.9	57.6	55.7
Next Pregnancy Postponed Until Lactation Discontinued	—	0.3	0.1	—	—	—

<sup>1</sup> In this table the adoption of a child when contraception was being practiced is considered the equivalent of a planned pregnancy.

\* A large majority of the “relatively sterile” couples who had one or more pregnancies did not know at the end of the first puerperium that it would be difficult or impossible to have a second or subsequent conception, or produce a live born child. In addition, some of the couples whose first pregnancy was delayed by low fecundity wished to lessen the likelihood of too short an interval between puerperium and conception. The situation was similar, but more compelling, at the end of the second puerperium.

Of the 1,003 "relatively fecund" couples who tried to delay or prevent the first pregnancy, nearly half (49.4 per cent) accomplished what they desired, that is, either the first conception did not occur before it was planned, or the couple was childless. (See Table 3.) Over three-fourths of the couples who were successful in the first interval had their first conception after contraception was stopped for that purpose.<sup>12</sup> Nearly all of the 114 never pregnant couples in this successful group had not wanted a child during the twelve to fifteen years which had elapsed between marriage and interview, and had practiced contraception regularly and effectively. Three of them, however, had stopped contraception a few weeks or months before they were interviewed, because they decided to try to have their first child.<sup>13</sup>

The fact that 441 couples made no attempt to postpone the first pregnancy does not mean that they did not know how to do so. Of the 409 wives in this category who reported when they first learned about contraception, fifty-three (13.0 per cent) acquired information before marriage and twenty-three (5.6 per cent) "at" marriage. The number of informed bridegrooms probably was substantially larger.

Similarly, the lack of an attempt at postponement by 441 couples does not mean that each of them was anxious to start their family as soon as possible. Couples were not asked how soon after marriage the first pregnancy was wanted, but rather whether it was wanted at the time it occurred. The first pregnancy of 191 of the 441 couples began either before marriage or less than three months afterward; 38.8 per cent of these wives and 44.2 per cent of the husbands were glad to have it so soon,

<sup>12</sup> A few of these wives douched "for cleanliness only" after they stopped what they thought was contraception in order to have the first baby, and presumably delayed conception beyond the date desired.

<sup>13</sup> Although these 114 couples (and the seven couples in which the wife had douched "for cleanliness only" since marriage and did not conceive), are classified as "relatively fecund," it is certain that some of them should be classified as "relatively sterile." In other words their childlessness is due to their low fecundity or sterility rather than to their perfect use of contraceptives. This matter will be discussed in the next paper.

but 55.5 per cent of the wives and 44.8 per cent of the husbands were disappointed—nearly half of them very much so. Among the sixty-seven couples whose first conception occurred three to six months after marriage (and who also made no effort to postpone it) the attitudes were much more favorable, for nearly 65 per cent of the wives and 70 per cent of the husbands wanted it then (a majority of these wanting it “very much”) and less than 25 per cent expressed disappointment. In both cases the desire for an early pregnancy was stronger among wives who learned about contraception (but did not practice it) before the first pregnancy than among those who did not learn about it until a later date.

Efforts to plan or prevent the second pregnancy were only slightly more effective than those for the first. But whereas the couples who planned the first pregnancy outnumber those who prevented it by over three to one, the couples who planned the second pregnancy barely exceed those who prevented it. The most effective planning occurred in the third interval, the number of couples who were successful (579) being more than half again as large as the number who were unsuccessful (345). Most of the former (more than five out of six) are couples who prevented a third pregnancy. With subsequent intervals there is a gradual decline in the proportion of couples achieving what they sought, for few couples who had learned to use contraceptives effectively had a fourth pregnancy, and only two had a fifth. In consequence, all but two of the couples who tried to postpone or prevent the sixth pregnancy either had not tried contraception previously or had been unsuccessful in their efforts. The wonder is that they achieved as high a degree of success as they did.

The planning of fertility should be considered from the standpoint of conceptions, as well as from that of couples. The first conceptions of “relatively fecund” couples are divided fairly evenly among those occurring (a) before positive planning was begun (32.7 per cent), (b) in spite of restrictive measures (37.6 per cent), and (c) when contraception was stopped to

have a child (28.9 per cent). (See Table 4.) Because approximately three-fourths of the couples who had not tried to postpone or prevent the first pregnancy began such efforts before the end of the first puerperium, the proportion of second and subsequent conceptions occurring before the resort to contraception was much lower than that for the first. The relative frequency of planned conceptions was highest for the second (32.0 per cent), then decreased rapidly. Only three of the fifth pregnancies were planned, and none of those of a higher order. The majority of the second and subsequent pregnancies, therefore, occurred in spite of attempts to postpone or prevent them, the proportion rising from 54.3 per cent for the second to 84.1 per cent for the fifth, and reaching 100 per cent for the small number having a ninth pregnancy.

Although a majority of the "relatively fecund" couples who tried to space or restrict pregnancies were not completely successful in their efforts, most of them were partially successful.

Table 4. Conceptions of "relatively fecund" couples by ordinal number, and by contraceptive status.<sup>1</sup>

CONTRACEPTIVE STATUS	ORDINAL NUMBER OF CONCEPTIONS					
	First	Second	Third	Fourth	Fifth	Sixth
Number of Conceptions	1,323	1,014	516	248	107	48
Percentage Occurring: Before Contraception Was Begun	32.7	12.2	10.1	9.3	9.3	16.7
In spite of Contraception When Contraception Was Discontinued: For Other Reasons Than to Conceive <sup>2</sup>	37.6	54.3	66.5	73.0	84.1	81.2
In Order to Conceive	0.8	1.5	3.3	4.4	3.7	2.1
	28.9	32.0	20.2	13.3	2.8	—

<sup>1</sup> In this table the adoption of a child is considered the equivalent of a planned pregnancy if it occurred when contraception was being practiced, but is ignored if it occurred when the couple was sterile.

<sup>2</sup> The more common reasons are: (a) the supply of contraceptives was exhausted (usually condom), often because the couple lacked money to buy more, (b) the couple was away from home and could not use conveniently the customary method of contraception (usually douche), and (c) the couple thought they were sterile.



If conception could not be avoided or put off until desired, at least it did not occur until months or years later than it would have occurred if left to nature. Among the 373 couples who did not use contraceptives or douche "for cleanliness only" before the first pregnancy, conception occurred within three months of marriage in more than half the cases and within a year in more than 85 per cent of the cases. (See Table 5.) In contrast, although the 508 couples who practiced contraception with partial success in the first interval had their first pregnancy earlier than they wanted it, only a little over one-fifth of them had it within three months of marriage, barely 56 per cent had it within a year. One-sixth of the couples stopping contraception in order to conceive had their first pregnancy within one year of marriage; 22.3 per cent had it in the second year, 13.1 per cent in the third year, and 19.9 per cent in the fourth or fifth years. Among the wives who maintained that contraception was not practiced, though douching was done "for cleanliness only," the first conception occurred after a somewhat longer interval than that for the partially successful contraceptors, but otherwise the distribution of the two groups was much the same.

The situation between the first and second pregnancies was much like that before the first, except for the influence of the anovulatory period which usually follows a puerperium. Over one-third of the couples not using contraceptives or douche "for cleanliness only" during the second interval had their second conception within six months of the end of the first puerperium, and over two-thirds had it within one year. Among the partially successful contraceptors the corresponding fractions are less than half as large. The couples who planned the second pregnancy spaced it about as long after the first as those who planned the first spaced it after marriage.

The number of couples that did not try to prevent or postpone their third and fourth pregnancies is small, but large differences between their distribution by length of interpregnancy intervals and the distribution of other couples are sta-

Table 5. Length of the intervals preceding the pregnancies of "relatively fecund" couples, by contraceptive practice (on a "motive" basis).<sup>1</sup>

LENGTH OF INTERVAL	COUPLES HAVING PREG- NANCY SPECIFIED	COUPLES NOT PRACTICING CONTRACEPTION		COUPLES PRACTICING CONTRACEPTION <sup>2</sup>	
		Not Using Douché "For Cleanliness Only"	Using Douché "For Cleanliness Only"	Not Stopping Because Baby Wanted	Stopping Because Baby Wanted
MARRIAGE TO FIRST CONCEPTION					
Number of Couples	1,323	373	61	508	381
Percentage of Intervals:					
Less Than 3 Months	23.4	50.4	18.0	21.5	0.3
3- 5.9 Months	11.1	16.9	13.1	10.0	6.6
6-11.9 Months	18.4	18.0	26.2	24.6	9.4
1- 1.9 Years	14.7	7.5	9.8	14.8	22.3
2- 2.9 Years	9.5	6.4	1.6	10.0	13.1
3- 4.9 Years	10.1	0.8	8.2	9.8	19.9
5- 6.9 Years	6.4	—	23.0	6.5	10.0
7- 9.9 Years	4.2	—	—	2.2	11.5
10 or More Years	2.2	—	—	0.6	6.8
FIRST PUERPERIUM TO SECOND CONCEPTION					
Number of Couples	1,014	108	28	562	313
Percentage of Intervals:					
Less Than 3 Months	5.7	17.6	—	5.5	2.6
3- 5.9 Months	7.3	19.4	(25.0)	6.8	2.6
6-11.9 Months	17.0	34.3	( 7.1)	19.0	7.7
1- 1.9 Years	25.2	22.2	(42.9)	26.0	23.3
2- 2.9 Years	13.3	2.8	(14.3)	13.7	16.3
3- 4.9 Years	15.1	3.7	( —)	14.2	22.0
5- 6.9 Years	8.6	—	(10.7)	7.3	13.7
7- 9.9 Years	5.4	—	—	4.3	9.9
10 or More Years	2.4	—	—	3.2	1.9
SECOND PUERPERIUM TO THIRD CONCEPTION					
Number of Couples	516	49	23	347	96
Percentage of Intervals:					
Less Than 3 Months	4.5	(14.3)	—	3.2	5.2
3- 5.9 Months	7.4	(22.4)	( 8.7)	6.6	2.1
6-11.9 Months	15.5	(22.4)	(17.4)	16.7	7.3
1- 1.9 Years	27.7	(36.7)	(30.4)	27.7	21.9
2- 2.9 Years	13.0	( 2.0)	( 8.7)	15.6	10.4
3- 4.9 Years	18.4	( 2.0)	(21.7)	18.2	27.1
5- 6.9 Years	7.9	—	(13.0)	6.1	17.7
7- 9.9 Years	5.2	—	—	5.5	8.3
10 or More Years	0.4	—	—	0.6	—
THIRD PUERPERIUM TO FOURTH CONCEPTION					
Number of Couples	248	21	11	186	30
Percentage of Intervals:					
Less Than 3 Months	4.8	( 9.5)	( 9.1)	4.8	—
3- 5.9 Months	9.3	(33.3)	( 9.1)	8.1	—
6-11.9 Months	20.6	(33.3)	(18.2)	17.2	(33.3)
1- 1.9 Years	29.0	( 9.5)	(27.3)	33.9	(13.3)
2- 2.9 Years	12.9	—	(18.2)	12.9	(20.0)
3- 4.9 Years	14.1	( 4.8)	( 9.1)	14.0	(23.3)
5- 6.9 Years	5.6	( 9.5)	—	5.4	( 6.7)
7- 9.9 Years	3.6	—	( 9.1)	3.8	( 3.3)
10 or More Years	—	—	—	—	—

<sup>1</sup> Percentages based on fewer than fifty couples are shown in parentheses.

<sup>2</sup> Excludes the 4 pregnancies to wives who used lactation for contraception, and conceived after the baby was weaned.

tistically significant. Whereas 59 per cent of the noncontraceptors not douching "for cleanliness only" had the third pregnancy less than a year after the second and over 75 per cent had the fourth pregnancy equally soon after the third, the corresponding proportions for the partially successful contraceptors are barely 25 and 30 per cent respectively, or less than half as large. Furthermore, over one-third of the partially successful contraceptors, but less than one-sixth of the noncontraceptors not douching "for cleanliness only," postponed their third or fourth conception two or more years. The completely successful contraceptors spaced their third pregnancy much like their first and second, nearly 15 per cent having it within a year and nearly 60 per cent waiting one to five years. The few who planned the fourth pregnancy did not wait as long as for the third, the interval being less than a year for one-third of them, and one to five years for over 55 per cent.

#### B. CLASSIFYING "RELATIVELY FECUND" COUPLES AS TO THE PLANNING OF FERTILITY

*Number and Spacing of Pregnancies Planned.* The information regarding contraception discussed in Section A provides a basis for the first steps in classifying couples according to the planning of fertility, for it shows which ones tried to plan, and whether or not their efforts were successful. If fertility is judged according to pregnancies, the most highly planned group of "relatively fecund" couples consists of those who were successful in limiting their pregnancies to the number wanted, and in spacing them. It includes two main subgroups, (a) the couples who never were pregnant because of contraception, and (b) the couples whose conceptions all occurred when contraception was stopped because a child was wanted. It will be referred to in the future as the "number and spacing planned" group.

*Number of Pregnancies Planned.* The second group in the fertility planning hierarchy consists primarily of couples whose last conception occurred when contraception was stopped for

that purpose, but who had one or more prior conceptions under other conditions. These couples planned the number of their pregnancies, and the length of some (but not all) of the intervals between them. For this reason the group is labeled "number planned." In addition to the foregoing couples it includes a relatively small number with a somewhat different reproductive history. Most of them are couples whose last pregnancy was not planned, but who had stopped contraceptive practices a few weeks or months before the interview because they wanted another child. The few others are couples who used illegal abortion successfully in their fertility planning program. Some of them terminated all of their pregnancies in this manner; the others had at least one planned pregnancy but subsequently had one or more unplanned pregnancies which were all terminated by illegal abortion. The couples who were childless because of illegal abortion could be included in the "number and spacing planned" group if the classification were based on live births, but probably should not be because the results were obtained by a method of belated control which is generally considered much less desirable than contraception.

Before considering the other fertility planning groups, two minor matters should be clarified. First, since the classification under consideration is based on pregnancies rather than live births or living children, a very few couples in the two groups discussed above had more children than they wanted, for the last pregnancy produced twins. Second, a somewhat larger number had fewer children than they wanted. In most cases this occurred because some pregnancies ended in unintentional wastage (miscarriage or stillbirth) or therapeutic abortion, or because some children died, and the losses had not been replaced. With some of the remaining couples, however, the reason was simply that they were still in the "family-increasing" stage. Many of them had stopped contraception a few weeks or months before they were interviewed because they wanted a child; most of the wives probably conceived within a reasonable length of time. Finally, a small number of couples

had fewer pregnancies than desired because the wife thought that she should douche "for cleanliness" immediately after intercourse, and that such action would not interfere with conception. As mentioned previously some of these wives may have failed to conceive or been slow in conceiving because of sterility or low fecundity rather than the use of a douche "for cleanliness only," but because of the efficacy of douching in preventing conception when done for that purpose (to be discussed in a later article) these couples are classified as "relatively fecund." They may be considered as having "planned" fertility because, like the other couples in the "number and spacing planned" and "number planned" groups, they had not had more pregnancies than they wanted. But since they unwittingly had kept family size below that desired, they may also be considered as having "underplanned" fertility. Both concepts will be used in the analysis.

*Number of Pregnancies Quasi-Planned.* In order to classify the couples whose pregnancies were not "number and spacing planned" or "number planned" as explained above, it is necessary to use additional criteria. Among those available, the most useful are the attitudes of the husband and the wife toward the last pregnancy, and toward a pregnancy after the interview. These attitudes were recorded along a five point scale, ranging from "definitely not" wanting a child to wanting one "very much." In many cases the wife told the interviewer that she and her husband wanted a child when the last pregnancy began, even though contraception was being practiced at the time. If the conception had not occurred when it did, control measures presumably would have been stopped later. In many other cases the husband or wife (or both) did not want a child when the last conception occurred, but both of them wanted another child at some time in the future, and thought they were able to have it (*i.e.*, were not sterile). If their statements are taken at face value, both types of couples did not have more pregnancies than they desired (for either the last pregnancy or an additional pregnancy was wanted), conse-

quently they should be classified as "number planned." But because of the possibility that the reported "wanting" of the last pregnancy was a rationalization rather than a true feeling, and that the expressed desire for another child would never be supported by action (*i.e.*, by the discontinuance or relaxation of contraception in order to conceive), it seems preferable to consider such couples as having "quasi-planned" fertility, that is, as appearing to have planned their fertility, but not having done so in fact.<sup>14</sup>

The classification of the couples who said they wanted a certain number of children as soon as possible after marriage, who did not begin contraception until they had that number, and who prevented additional pregnancies, poses a difficult problem. If such postponement of control measures constitutes planning these couples should be assigned to the "number and spacing planned" group, otherwise they should be considered "quasi-planned." The latter seems preferable because stopping contraception to have a child requires positive action (the use of control measures for a time), whereas not starting contraception requires only negative action. It is believed that almost all, if not all, of the couples who reported that they stopped contraception in order to have a child actually did so. These couples would have a valid reason for their action, and would not feel a need to rationalize. In contrast, it is believed that an important proportion of the couples who did not begin control measures until after one or more pregnancies (a) realized the general feeling that pregnancies should be spaced, (b) disliked to admit even to themselves that they had not done so because of ignorance, carelessness, or other unfavorable reason, and (c) rationalized their behavior by reporting (and in many cases believing) that a desire to have one or more children as soon as possible was the motivating factor. If the couples who truly wanted one or more pregnancies as soon as

<sup>14</sup> The "quasi-planned" group also includes a few couples whose last pregnancy was not wanted then or later and was terminated by an illegal abortion, but whose next to last pregnancy (although not planned) was wanted then or later by both the wife and husband.



possible could be distinguished from those for whom such a statement was only a rationalization, they should be included in the completely planned groups. Since this separation is impossible in the present study, it seems preferable to restrict the "number and spacing planned" group to couples who meet the more rigorous test, and to classify those in question as having "quasi-planned" fertility.

*Too Many Pregnancies.* There remain to be classified the couples in which either the wife or husband did not want a child after the interview or at the time of the last conception. These couples had excess fertility, *i.e.*, one or more pregnancies after the last wanted, and may well be subdivided according to the number of excess pregnancies. Because of the disadvantages of having many groups with a small number of couples, only two categories are used here. In the first, the number of pregnancies after the last wanted by the wife plus the number after the last wanted by the husband equals one, two, or three. In the second, the sum of such pregnancies equals four or more. If the attitudes of the wife and husband are averaged, the number of excess pregnancies is one-half, one, or one and one-half for the couples in the first group and two or more for those in the second. For brevity the former will be referred to hereafter as the "one-too-many" group, and the latter as the "two-plus-too-many" group.

The most striking fact about the distribution of the "relatively fecund" couples by fertility planning status is that those with planned fertility outnumber those with quasi-planned or those with excess fertility. If the classification is made on a pregnancy basis (with no allowance for "underplanning") 42.1 per cent of the couples are in the two "planned" groups, 31.4 per cent in the "quasi-planned" group, and 26.5 per cent in the two "excess fertility" groups. (*See Table 6.*) If the groups are considered individually, the "quasi-planned" couples are found to be most numerous (31.4 per cent) followed closely by the "number and spacing planned" (27.9 per cent). Couples with one too many pregnancies are well behind the foregoing (19.4



per cent), and are followed by those planned as to number but not as to spacing. The smallest group, with at least two excess pregnancies per family, contains only half as many couples as the next larger group. In short, it appears that only slightly more than 25 per cent of the couples studied had more pregnancies than they wanted, and that nearly 75 per cent had the number that they wanted.

Using live births or living children instead of pregnancies as a basis for classifying couples as to the planning of fertility makes no significant difference in the resulting distribution, because pregnancy wastage and deaths of children occurred at much the same rate in each group. Classifying by themselves

Table 6. "Relatively fecund" couples by fertility planning status, according to selected criteria.

FERTILITY PLANNING STATUS	DISREGARDING "UNDERPLANNING" <sup>1</sup>			ALLOWING FOR "UNDERPLANNING" <sup>1</sup>		
	Preg- nan- cies A	Live Births B	Living Child- ren C	Preg- nan- cies D	Live Births E	Living Child- ren F
	PERCENTAGE DISTRIBUTION					
<i>Planned Fertility</i>						
Number and Spacing Planned	27.9	29.7	30.6	27.1	28.9	29.8
Number Planned	14.2	13.7	12.8	14.1	13.6	12.7
Quasi-Planned Fertility	31.4	31.5	31.6	30.8	30.9	31.0
<i>Excess Fertility</i>						
One-Too-Many	19.4	19.0	19.0	19.2	18.8	18.8
Two-Plus-Too-Many	7.1	6.0	5.9	7.1	6.0	5.9
Underplanned Fertility	—	—	—	1.7	1.7	1.7
	NUMBER OF COUPLES					
<i>Planned Fertility</i>						
Number and Spacing Planned	403	429	442	392	418	431
Number Planned	205	198	185	204	197	184
Quasi-Planned Fertility	454	455	457	445	446	448
<i>Excess Fertility</i>						
One-Too-Many	280	275	275	277	272	272
Two-Plus-Too-Many	102	87	85	102	87	85
Underplanned Fertility	—	—	—	24	24	24

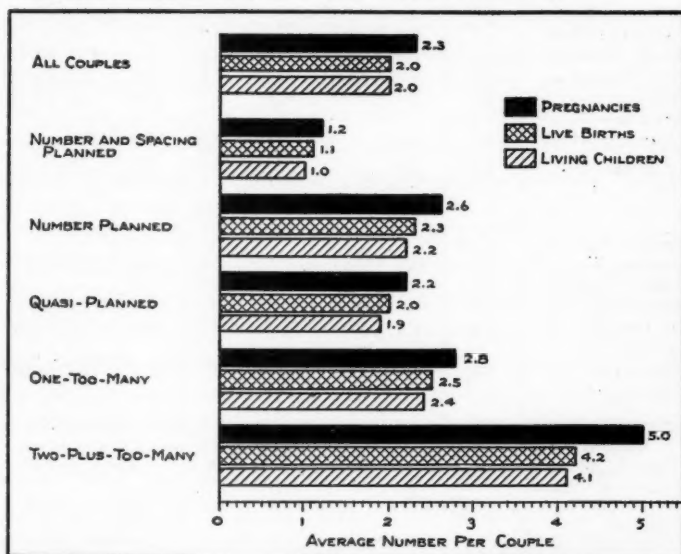
<sup>1</sup> An adopted child is considered equivalent to a planned pregnancy. Couples may be classified as underplanned if the wife is believed to have reduced unintentionally the number of pregnancies, live births, or living children by douching "for cleanliness only."

the "underplanned" couples (those who had fewer pregnancies and children than they wanted, presumably because the wife douched "for cleanliness only") also makes no significant difference in the distribution, for only twenty-four couples are "underplanned."

### C. FAMILY SIZE AND INTERPREGNANCY INTERVALS, BY PLANNING STATUS OF "RELATIVELY FECUND" COUPLES

As would be expected from the basis of classifying "relatively fecund" couples according to their success in planning fertility, the groups differ in important degree with respect to the number and spacing of pregnancies and live births. At one extreme are the "number and spacing planned" families with an average of 1.2 conceptions and 1.1 births; at the other extreme are the "two-plus-too-many" families with an average of 5.0 conceptions and of 4.2 births. (See Figure 2 and Table 7.) The

Fig. 2. Average number of pregnancies, live births, and living children per couple, by fertility planning status of the couple. (See Table 7.)



other three groups are similar in number of births, the "number planned" averaging 2.3, the "quasi-planned" 2.0, and the "one-too-many" 2.5.<sup>15</sup> Unless additional births occurred after the

Table 7. "Relatively fecund" couples by number of pregnancies, number of live births, and number of living children, by fertility planning status.<sup>1</sup>

FERTILITY PLANNING STATUS	AVER- AGE PER COUPLE	PERCENTAGE WITH						
		0	1	2	3	4	5	6+
		PREGNANCIES						
Number and Spacing Planned	1.2	30.0	34.0	28.8	5.5	1.5	0.2	—
Number Planned	2.6	—	2.9	56.1	25.9	11.7	1.5	2.0
Quasi-Planned	2.2	—	28.0	43.2	17.0	6.8	3.3	1.8
One-Too-Many	2.8	—	13.9	23.6	38.9	16.4	5.7	1.4
Two-Plus-Too-Many	5.0	—	—	4.9	6.9	32.4	23.5	32.4
TOTAL	2.3	8.4	21.4	34.5	18.6	9.7	4.1	3.4
		LIVE BIRTHS						
Number and Spacing Planned	1.1	31.3	36.7	27.8	3.0	1.0	0.2	—
Number Planned	2.3	2.0	7.8	61.5	20.0	7.3	0.5	1.0
Quasi-Planned	2.0	0.9	32.4	44.3	13.9	6.8	1.1	0.7
One-Too-Many	2.5	0.4	19.3	32.9	33.9	10.4	2.1	1.1
Two-Plus-Too-Many	4.2	—	—	8.8	22.5	31.4	18.6	18.6
TOTAL	2.0	9.3	25.3	37.4	16.2	7.7	2.2	1.9
		LIVING CHILDREN						
Number and Spacing Planned	1.0	31.3	38.7	26.1	3.2	0.5	0.2	—
Number Planned	2.2	2.0	10.7	63.4	18.5	4.9	—	0.5
Quasi-Planned	1.9	0.9	35.2	44.5	13.2	4.6	1.1	0.4
One-Too-Many	2.4	0.4	20.7	33.9	34.3	8.2	1.8	0.7
Two-Plus-Too-Many	4.1	—	—	8.8	23.5	36.3	13.7	17.6
TOTAL	2.0	9.3	27.4	37.5	16.0	6.4	1.7	1.6

<sup>1</sup> The fertility planning classification is based on pregnancies, without an allowance for underplanning. For the number of couples in each group, see Table 6, Column A.

In this table an adopted child is classified as though it were born to the couple.

<sup>15</sup> It should be remembered that the classification scheme places all couples with  
(Continued on page 87)

interview, the two groups with lowest fertility ("number and spacing planned" and "quasi-planned") would not reproduce themselves on the basis of current death rates. In contrast, the "number planned" and the "one-too-many" groups had contributed slightly to population growth before they were interviewed, and the "two-plus-too-many" had made a relatively large contribution.

The differences between groups in the average number of pregnancies, live births, and living children are due, of course, to differences in the proportion of couples with zero, one, two, or some other number. Among the "number and spacing planned" couples those with one birth are the most numerous (36.7 per cent), followed by those with no birth (31.3 per cent) and those with two births (27.8 per cent). (See Table 7.) Only 4.2 per cent of the wives had borne more than two children. Among the "number planned" couples, in contrast, a majority (61.5 per cent) had borne two children, families with three births are second (20.0 per cent), and the remainder are divided almost equally between those with none or one and those with four or more. Families with two births lead also in the "quasi-planned" group (44.3 per cent), but those with one birth are second (32.4 per cent) and those with three a poor third (13.9 per cent). Families with four or more births are about as common relatively in this group as in the "number planned" group.

Approximately one-third of the wives in the "one-too-many" group had borne two children, and another third three children. Fewer than one-fifth had borne only one child, barely one-tenth had borne four children, and less than four per cent had borne five or more. According to the classification scheme no couple in the "two-plus-too-many" group could have had less than two pregnancies, and relatively few only two. It is partly for

only one planned pregnancy (and none not planned) in the "number and spacing planned" group, hence almost all of the couples in the "number planned" group had two or more pregnancies. (The exceptions are the few couples with one unplanned pregnancy which was terminated illegally.) This virtual exclusion of one-child families from the "number planned" group accounts for the higher average fertility of this group than of the "quasi-planned" group.

Table 8. Length of the intervals preceding the pregnancies of "relatively fecund" couples, by fertility planning status.<sup>1</sup>

LENGTH OF INTERVAL	FERTILITY PLANNING STATUS					FERTILITY PLANNING STATUS				
	Number and Spacing Planned	Number Planned	Quasi-Planned	One-Too-Many	Two-Plus-Too-Many	Number and Spacing Planned	Number Planned	Quasi-Planned	One-Too-Many	Two-Plus-Too-Many
MARRIAGE TO FIRST CONCEPTION										
Number of Couples	282	205	454	280	102	145	199	327	241	102
Average Number of Months	54.0	16.7	17.4	17.4	6.6	39.8	39.5	30.1	30.3	16.0
Percentage Reporting:										
Less than 3.0 Months	—	30.7	27.8	28.2	40.2	2.8	6.0	4.9	7.1	8.8
3.0-5.9 Months	6.4	9.3	11.5	11.8	24.5	4.8	3.5	7.3	9.1	13.7
6.0-11.9 Months	8.2	19.0	22.2	22.1	18.6	7.6	8.0	21.7	18.7	26.5
12.0-23.9 Months	16.3	15.6	14.1	14.3	11.8	24.1	23.1	23.1	22.8	29.4
24.0-35.9 Months	12.4	13.2	7.9	8.2	4.9	18.6	15.6	12.5	11.2	8.8
36.0-59.9 Months	19.1	5.9	10.1	7.9	—	20.0	21.6	8.3	18.3	9.8
60.0-83.9 Months	12.8	4.9	5.1	5.7	—	12.4	10.6	9.5	5.8	2.9
84.0+ Months	24.8	1.5	1.3	1.8	—	9.7	11.6	7.6	7.1	—
SECOND FURBERIUM TO THIRD CONCEPTION										
Number of Couples	29	84	131	176	97	7	31	54	66	90
Average Number of Months	(36.6)	37.8	25.0	33.8	21.1	(29.1)	(25.0)	28.6	28.2	37.3
Percentage Reporting:										
Less than 3.0 Months	—	3.6	3.8	2.9	10.3	—	(3.2)	7.4	1.5	6.7
3.0-5.9 Months	(6.9)	2.4	13.0	5.1	8.2	—	(3.7)	9.3	18.2	3.3
6.0-11.9 Months	(10.3)	13.1	18.3	10.9	23.7	(28.6)	(35.5)	14.8	10.6	25.6
12.0-23.9 Months	(13.8)	26.2	28.2	32.0	24.7	(14.3)	(12.9)	22.2	33.3	36.7
24.0-35.9 Months	(13.8)	9.5	13.0	13.1	15.5	(28.6)	(12.9)	14.8	15.2	8.9
36.0-59.9 Months	(41.4)	19.0	15.3	20.0	12.4	(28.6)	(15.1)	20.4	3.0	16.7
60.0-83.9 Months	(10.3)	16.7	5.3	8.0	3.1	(—)	(4.5)	3.7	13.6	1.1
84.0+ Months	(3.4)	9.5	3.1	8.0	2.1	(—)	(3.2)	7.4	4.5	1.1

<sup>1</sup> In this table the adoption of a child is considered the equivalent of a planned pregnancy if it occurred when contraception was being practiced, but is ignored if it occurred when the couple was sterile.

this reason that four-birth families are most numerous (31.4 per cent), three-child families are second (22.5 per cent), five-child families third (18.6 per cent), and six-child families fourth (14.7 per cent).

Wide variations in the length of interpregnancy intervals would be expected between the fertility planning groups, and are found. Not one of the "number and spacing planned" couples had a first conception less than three months after marriage, but 27.8-40.2 per cent of the couples in the other groups are in this category. (See Table 8.) At the other extreme, not one of the "two-plus-too-many" couples had their first conception three or more years after marriage; whereas 12.3-56.7 per cent of the couples in the other groups postponed it to this extent. In general, the greater the success in planning fertility the longer the delay before the first conception.

Similar, but somewhat smaller, differences between groups are found in the length of subsequent interpregnancy intervals. Only 15.2 per cent of the "number and spacing planned" couples had their second conception less than a year after the first puerperium ended, whereas 49.0 per cent of the "two-plus-too-many" couples did so. In contrast, 42.1 per cent of the couples in the "number and spacing planned" group, but only 12.7 per cent of those in the "two-plus-too-many" group, postponed their second conception for three or more years. The other planning groups (with one exception) occupy intermediate positions, as would be expected.

The pattern of distribution by the length of the third and fourth intervals is much like that for the second interval for the "number planned," "quasi-planned," and "one-too-many" groups. (See Table 8.) In the "two-plus-too-many" group, however, there is a marked decrease in the proportion of intervals lasting less than six months, and a marked increase for those lasting two years or longer.

Only 108 couples had a fifth pregnancy and only forty-nine a sixth, the large majority being in the "two-plus-too-many" group. Over two-thirds of the fifth conceptions occurred less

than twenty-four months after the fourth puerperium, and nearly three-fourths of the sixth conceptions occurred equally soon after the fifth.

The distribution of the couples in each planning group by the actual length of intervals differs greatly from their distribution by their ideas of the most desirable length of interval. Six per cent of the "number and spacing planned" wives said they thought one year or less was the most desirable time between marriage and the first birth (which ordinarily means three months between marriage and the first conception), but not one of them had a first conception so soon. (Compare Tables 8 and 9.) In contrast, 11.8 per cent of the "two-plus-too-

Table 9. "Most desirable" time between marriage and first birth, and between subsequent births, according to "relatively fecund" wives by fertility planning status.

"MOST DESIRABLE" TIME	ALL COUPLES	FERTILITY PLANNING STATUS				
		Number and Spacing Planned	Number Planned	Quasi- Planned	One- Too- Many	Two- Plus- Too- Many
BETWEEN MARRIAGE AND FIRST BIRTH						
Number of Wives	1,444	403	205	454	280	102
Percentage Reporting:						
One Year or Less	10.3	6.0	9.8	12.8	12.1	11.8
One or Two Years	9.6	9.0	10.7	10.2	8.2	10.8
Two Years	44.0	36.9	51.7	44.4	46.8	47.1
Two or Three Years	13.6	16.2	10.7	12.1	15.0	11.8
Three Years	13.5	19.5	13.2	12.4	7.5	12.7
Three or Four Years	3.5	3.2	2.4	3.5	4.3	4.9
Four Years or More	5.5	9.2	1.5	4.6	6.1	1.0
BETWEEN SUBSEQUENT BIRTHS						
Percentage Reporting:						
One Year or Less	1.0	0.7	0.5	1.5	0.7	2.0
One or Two Years	4.8	2.0	4.9	8.2	3.9	2.9
Two Years	41.9	42.9	42.9	40.3	42.5	42.2
Two or Three Years	24.2	23.7	22.4	23.7	25.7	27.5
Three Years	20.1	21.2	16.1	21.7	19.3	18.6
Three or Four Years	4.4	5.0	5.4	3.5	3.9	4.9
Four Years or More	3.6	4.5	7.8	1.1	3.9	2.0



many" wives thought a year or less was most desirable, but about 40 per cent (*nearly four times as many* on a relative basis) had a pregnancy ending before the first anniversary of their wedding. Between two and three years was mentioned as the most desirable time by more than two-thirds of the wives in each group, but only a relatively small proportion (one-sixth or less) actually had their first child at that time. Nearly two-thirds of the "number and spacing planned" wives waited longer than three years, and more than three-fifths of the wives in the other groups had their first child in less than two years.

Opinions regarding the most desirable spacing of the second and subsequent children were more alike than those regarding the spacing of the first child, for between 80 and 90 per cent of the wives in each group thought that there should be from two to three years between births. As with first births, however, this ideal was missed much more often than it was met. Considerably more than half of the wives in the "number and spacing planned" and "number planned" groups postponed their second birth until at least three years after the first, whereas approximately 40 per cent of the wives in the "quasi-planned" and "one-too-many" groups and 60 per cent of those in the "two-plus-too-many" group had it within two years. The third and fourth intervals of a slightly larger proportion of couples were within the limits reported most desirable, but here as before, the tendency was for the "number and spacing planned" and "number planned" groups to space their third and fourth children more than three years apart, for the "two-plus-too-many" group to have them less than two years apart, and for the other groups to occupy intermediate positions.

#### D. DIFFERENCES IN EFFORTS TO PLAN FERTILITY AS CAUSES OF DIFFERENCES IN FAMILY SIZE

The extent to which the additional children, more closely spaced, of the "two-plus-too-many" families than of the "number and spacing planned" families result from differences in fecundity, or from differences in the desire and ability to con-

trol it, is a highly important question. Most differences in fecundity are due primarily to physiological causes, which on the whole cannot be changed easily. If they dominate the pattern of family size and spacing, this pattern will be relatively stable. In contrast, differences in the number of children planned or in the success of planning are due to a wide variety of socio-economic and psychological factors, many of which may be influenced more easily. If they control the pattern of number and spacing of children, it would be expected to fluctuate in greater degree. The role of fertility planning will be considered first.

If fecund couples are to control conception they must know about one or more methods of doing so, and must use this

Table 10. When "relatively fecund" wives first learned of contraception, by success in planning fertility.<sup>1</sup>

WHEN WIFE FIRST LEARNED OF CONTRACEPTION	SUCCESS IN PLANNING FERTILITY					
	All Couples	Number and Spacing Planned	Number Planned	Quasi- Planned	One- Too- Many	Two- Plus- Too- Many
Number of Couples	1,444	403	205	454	280	102
Not Reporting	59	15	3	28	9	4
Reporting	1,385	388	202	426	271	98
<i>Percentage of Those Reporting That:</i>						
Never Learned of Contraception	0.2	0.0	0.0	0.5	0.4	0.0
Learned of Contraception Before Age 17 and At Least One Year Before Marriage	4.7	4.9	5.9	3.3	3.7	10.2
Before Marriage, Other "At" Marriage	31.1	40.2	21.3	27.7	31.4	29.6
After Marriage But Before First Pregnancy	39.1	54.4	38.6	34.0	31.4	23.5
Between 1st and 2nd Pregnancies <sup>2</sup>	4.6	0.5	4.0	7.5	6.3	5.1
Between 2nd and 3rd Pregnancies <sup>2</sup>	12.8	0.0	24.8	15.5	16.6	16.3
After Third Pregnancy	3.5	0.0	3.5	5.2	3.7	9.2
After Marriage, Time Not Stated	1.5	0.0	0.5	1.9	2.6	5.1
	2.5	0.0	1.5	4.5	4.1	1.0

<sup>1</sup> In this table douching "for cleanliness only" is not considered contraception.

<sup>2</sup> Includes those learning between 1st (or 2nd) pregnancy and interview.

knowledge. Most of the husbands in this study had learned of contraception before they were married, but only a minority of wives admitted being equally well informed. The proportion varied considerably between fertility planning groups, from a high of 45.1 per cent for the "number and spacing planned" to a low of 27.2 per cent for the "number planned." (See Table 10.) Marriage brought knowledge quickly to a large number of brides (to all but two in the "number and spacing planned" group), and almost eliminated the differentials between the other groups. Relatively few wives learned of contraception more than a few days after marriage and before the first preg-

Table 11. Interval in which contraception was first practiced (on a "motive" basis) by "relatively fecund" couples, by fertility planning status.

INTERVAL CONTRACEPTION FIRST PRACTICED	FERTILITY PLANNING STATUS					
	All Couples	Number and Spacing Planned	Number Planned	Quasi- Planned	One- Too- Many	Two- Plus- Too- Many
Number of Couples	1,444	403	205	454	280	102
Percentage That:						
Began Contraception:						
Before First Pregnancy	69.5	98.3	57.1	59.9	59.6	50.0
Between First and Second Pregnancies	21.2	—	36.1	27.1	28.2	29.4
Between Second and Third Pregnancies	5.0	—	4.9	7.0	7.5	8.8
Between Third and Fourth Pregnancies	1.9	—	1.0	2.6	2.5	5.9
Between Fourth and Fifth Pregnancies	0.6	—	—	0.9	0.7	2.0
Between Fifth and Sixth Pregnancies	0.1	—	—	0.2	—	—
After Sixth Pregnancy	0.1	—	1.0	—	—	2.0
Never Practiced Contra- ception	1.6	1.7 <sup>a</sup>	—	2.2	1.4	2.0
Cumulative Percentages:						
Began Contraception:						
Before First Pregnancy	69.5	98.3	57.1	59.9	59.6	50.0
Before Second Preg- nancy	90.7	98.3	93.2	87.0	87.8	79.4
Before Third Preg- nancy	95.7	98.3	98.1	94.0	95.3	88.2
Before Fourth Preg- nancy	97.6	98.3	99.1	96.6	97.8	94.1

<sup>a</sup> Each of these wives began to douche "for cleanliness only" before the first pregnancy.

nancy, but many learned between the first and second pregnancies. By the time the second pregnancy occurred the informed wives included about 85 per cent of the "two-plus-too-many" group, and 88 per cent or more of each of the other groups.

Knowing about contraception is one thing; practicing it may be another. All except seven of the "number and spacing planned" couples began to practice contraception at marriage<sup>18</sup> but some of the couples in the other groups were less prompt in putting their knowledge into practice. Most of the latter soon discovered that the first pregnancy had begun. In the "number planned," "quasi-planned," and "one-too-many" groups, approximately 70 per cent of the wives learned of contraception before the first conception, but less than 60 per cent of the couples tried to postpone it. (Compare Tables 10 and 11.) Such a lag occurred more frequently in the "two-plus-too-many" group, for whereas 68.4 per cent of the wives had learned about contraception before the first pregnancy, only 50 per cent of the couples utilized their knowledge. In all groups a large majority of the couples who did not use contraceptives before the first pregnancy began to do so when it ended. By the time the second conception occurred 93.2 per cent of the "number planned" couples had attempted birth control, and even in the "two-plus-too-many" group the proportion was nearly 80 per cent. The differential was narrowed further between the second and third pregnancies, the proportion of couples practicing contraception during or prior to the third interval rising to 98.1 per cent in the "number planned" group and to 88.2 per cent in the "two-plus-too-many" group. By the time the fourth pregnancy occurred the percentage for the latter had risen to 94.1, putting all groups on approximately the same basis in this respect.

As explained in the description of the planning groups, the "number and spacing planned," "number planned," and "quasi-planned" couples, with an average (respectively) of 1.2, 2.6,

<sup>18</sup> The seven wives began to douche "for cleanliness only" with equal promptness.

and 2.2 pregnancies per couple, had no more children than planned or desired. The other couples, however, had more than they desired. If the purpose of contraception had been to prevent rather than space pregnancies, and if it had been practiced continually and successfully from the time it was first begun, there would have been 0.6 instead of 2.8 pregnancies per couple in the "one-too-many" group and 1.0 instead of 5.0 in the "two-plus-too-many" group.<sup>17</sup> In other words, under such conditions these couples would have had the smallest families. It is clear, therefore, that the differences between the planning groups as to the time of first learning about contraception, or the time of first practicing it, had no major effect in causing the differences which were found in size of family.

The next matter to be considered is the effectiveness of the efforts to postpone conception or prevent it entirely. In this part of the analysis the intervals after the first pregnancy will be combined, but the interval preceding the first will be con-

<sup>17</sup> The average number of pregnancies per couple in each planning group which there would have been if no conception had occurred after the practice of contraception was started is computed by dividing (a) the sum of the numbers of couples not practicing contraception in or prior to given intervals by (b) the number of couples in the planning group. (Note that (a) is equivalent to the sum of the pregnancies occurring before contraception was ever started.) The data for the two groups mentioned are as follows:

Contraception Not Practiced on "Motive" Basis In or Prior To the :	Number of Couples in Planning Status Group	
	"One-Too-Many"	"Two-Plus-Too-Many"
First Interval	113	51
Second "	34	21
Third "	13	12
Fourth "	6	6
Fifth "	3	4
Sixth "	2	4
Seventh "	2	4
Eighth "	2	1
Ninth "	0	0
Total (= Sum Pregnancies Before Starting Contraception)	175	103
Number of Couples in Group	280	102
Average Number of Pregnancies Per Couple if None Occurred After the Beginning of Contraceptive Practice	0.63	1.01

sidered separately because normally it does not contain an anovulatory period during which conception is impossible as do the intervals which follow pregnancies. Furthermore, douching "for cleanliness only" will be classified as a contraceptive practice, for the experience of the women in this study shows that the effectiveness of douching in preventing conception is

Table 12. Effectiveness of contraceptive efforts (on an "action" basis) of "relatively fecund" couples before and after the first pregnancy, by fertility planning status.<sup>1</sup>

EXPOSURE AND CONCEPTIONS	FERTILITY PLANNING STATUS			
	Number Planned	Quasi-Planned	One-Too-Many	Two-Plus-Too-Many
BEFORE FIRST PREGNANCY				
Months of Exposure With Contraception	2,890	6,699	4,092	477
Number of Conceptions During This Exposure	120	252	132	55
Months of Exposure per Conception	24.1	26.6	31.0	8.7
Exposure With Contraception Per Cent of This Exposure During Which Contraceptives Were Used:				
"Always"	76.2	81.5	88.8	63.9
"Usually"	21.2	15.6	8.2	15.9
"Sometimes"	2.6	2.9	3.1	20.1
AFTER FIRST PREGNANCY				
Months of Exposure With Contraception	21,826	51,970	30,402	10,094
Number of Conceptions During This Exposure	88	445	409	343
Months of Exposure per Conception	248.0	116.8	74.3	29.4
Exposure With Contraception Per Cent of This Exposure During Which Contraceptives Were Used:				
"Always"	97.5	91.8	92.1	87.6
"Usually"	2.2	7.5	7.0	9.9
"Sometimes"	0.3	0.6	0.9	2.4

<sup>1</sup> In this table a douche "for cleanliness only" is, and lactation is not, considered a contraceptive. Adopted children are omitted.

not influenced in important degree by the motive involved. Finally, since by definition conceptions occurred in the "number and spacing planned" group only when contraception was stopped because a baby was wanted (although a very few of the wives continued to douche "for cleanliness only"), the contraceptive efforts of these couples were highly effective and need no further consideration here.

The attempts of the "two-plus-too-many" couples to postpone or prevent the first pregnancy were relatively unsuccessful, for conceptions occurred at the rate of one per 8.7 months of exposure with contraceptives. (See Table 12.) The other three groups were approximately three times as successful, the months of contraceptive exposure per conception varying between 24.1 for the "number planned" group and 31.0 for the "one-too-many" group. These differences can be explained in part by differences in the regularity of use of contraceptives. The couples in the "number planned," "quasi-planned," and "one-too-many" groups practiced contraception "always" or "usually" during more than 96 per cent of the period when they were trying to postpone or prevent the first pregnancy; they neglected contraception frequently during less than 4 per cent of this exposure.<sup>18</sup> In contrast, those in the "two-plus-too-many" group took chances frequently during more than 20 per cent, and were diligent contraceptors during less than 80

<sup>18</sup> In this study periods of contraception are classified as follows with respect to regularity of use of contraceptives:

- (a) Contraception practiced "always," *i.e.*, with no omissions, or with rare omissions numerically or relatively (not more than three or four times a year or 3 or 4 per cent).
- (b) Contraception practiced "usually," *i.e.*, omitted more often than in "a" but less than (approximately) one-fourth to one-third of the time when intercourse occurred.
- (c) Contraception practiced "sometimes," *i.e.*, omitted more often than in "b" but not discontinued entirely.

According to a strict interpretation of "always" a couple who omitted contraception once during the twelve to fifteen year period studied could not be classified as practicing it "always." Early in the field work, however, it was discovered that rare omissions were emphasized by wives if they thought that conception occurred as a result, but were not mentioned otherwise. Because wives reported that contraception was practiced "always" during periods with infrequent omissions and no conception, it was necessary to include in this category the periods with rare omissions which were believed to have resulted in conception. Few wives admitted more than one such omission.



per cent, of the corresponding period. It appears, therefore, that the frequent neglect of contraception by the "two plus-too-many" couples, and its less effective practice when not neglected, were responsible in important degree for the first pregnancy beginning so soon after marriage for this group as compared with the others. The less frequent neglect of contraception by the "one-too-many" couples than by the "quasi-planned" or "number planned" couples should have made the first interval longer for the "one-too-many" couples than for the others but apparently was offset by other factors.

After the first pregnancy the regularity with which contraception was practiced increased significantly in all groups, the proportion in the "always" category rising several points, and the proportion in the "usually" and "sometimes" categories decreasing correspondingly. In other words, nearly all couples decided that if they were going to try to postpone or prevent additional pregnancies they should not be careless. For this reason (and for others which will be analyzed in a later article) the effectiveness of contraceptive efforts in each of the planning groups was substantially higher after the first pregnancy than previously. The gains varied widely, however, being smallest for the "two-plus-too-many" couples and much the largest for the "number planned" couples. Among the former, contraceptive efforts after the first pregnancy failed frequently (at the rate of once in only 29.4 months), but among the latter they failed rarely (at the rate of once in 248.0 months). Such differences are much greater than those before the first pregnancy. They explain in large measure why the couples classified as having one more, or at least two more, pregnancies than they desired are in those groups rather than in one of the "planned" groups. Likewise they account for the larger families of the couples with "excess" rather than "planned" fertility.

#### E. DIFFERENCES IN THE FECUNDITY OF "RELATIVELY FECUND" COUPLES AS CAUSES OF DIFFERENCES IN THEIR FERTILITY

An adequate evaluation of the importance of differences in

fecundity as causes of the differences in fertility between the planning groups is a much more difficult task than the foregoing. There is little basis for saying anything regarding the fecundity of the couples in this study who used contraceptives "always" and who had no pregnancy; a clinic staff of expert gynecologists, urologists, endocrinologists, and other scientists, using the best laboratory techniques, could not be sure of classifying many such couples correctly. In contrast, the couples who did not use contraceptives (or douche "for cleanliness only") part or all of the time can be classified fairly accurately as to fecundity during portions of their married life by relating the months of exposure without contraception to the number of conceptions which occurred during this exposure. For such couples it is important to consider separately periods prior to the first use of contraceptives and periods when contraception was discontinued in order to conceive, because the first type of exposure usually begins at marriage, and the second type some months or years later. In consequence, the two types of periods usually differ in frequency of coitus, completeness of entrance, and other conditions affecting the likelihood of conceiving. Moreover, exposure after a pregnancy but prior to the first use of contraceptives usually begins a few weeks or months before the resumption of ovulation. In contrast, contraception is seldom discontinued in order to have another child until a sufficient time has elapsed since the previous puerperium to permit the resumption of ovulation.

Only two couples in the "number and spacing planned" group had any exposure to the risk of conception prior to the beginning of contraception (or of douching "for cleanliness only"), and the number of months involved was only two. Each of the other planning groups had many more such couples (between forty-four and 152), who had in the aggregate between 194 and 1,027 months of such exposure. The average number of months per conception under these conditions was lowest in the "two-plus-too-many" group (4.4) and highest in the "quasi-planned" group (6.8). (See Table 13.) The differ-

Table 13. Exposure and conceptions without contraception (on an "action" basis) of "relatively fecund" couples by fertility planning status.<sup>1</sup>

EXPOSURE AND CONCEPTIONS	NUMBER AND SPACING PLANNED	NUMBER PLANNED	QUASI-PLANNED	ONE-TOO-MANY	TWO-PLUS-TOO-MANY
BEFORE FIRST PREGNANCY					
Total Number of Couples	403	205	454	280	102
Number of Couples With Exposure Before Contraception Began	2	73	152	106	44
Months of This Exposure	2	462	1,027	605	194
Number of Conceptions During This Exposure	0	71	152	106	44
Months of Exposure Per Conception	—	6.5	6.8	5.7	4.4
Number of Couples with Exposure While Contraception Stopped to Have a Child	280	14	40	40	3
Months of This Exposure	1,170 <sup>a</sup>	64	101	73	3
Number of Conceptions During This Exposure	274 <sup>a</sup>	14	40	40	3
Months of Exposure Per Conception	4.3	(4.6)	2.5	1.8	—
AFTER FIRST PREGNANCY					
Total Number of Couples	282	205	454	280	102
Number of Couples With Exposure Before Contraception Began	0	12	49	34	21
Months of This Exposure	0	237	819	660	523
Number of Conceptions During This Exposure	0	22	66	55	45
Months of Exposure Per Conception	—	(10.8)	12.4	12.0	(11.6)
Number of Couples with Exposure While Contraception Stopped to Have a Child	149	188	20	29	6
Months of This Exposure	947 <sup>a</sup>	1,053 <sup>a</sup>	117	81	12
Number of Conceptions During This Exposure	174 <sup>a</sup>	203 <sup>a</sup>	21	31	8
Months of Exposure Per Conception	5.4	5.2	(5.6)	2.6	—

<sup>1</sup> In this table a douche "for cleanliness only" is, and lactation is not, considered a contraceptive. Adopted children are omitted.

Rates shown in parentheses are based on from ten to twenty-five couples. None are shown for fewer than ten couples.

<sup>a</sup> Excludes one couple whose first three conceptions occurred when contraception had been stopped for that purpose, but who did not report how long it had been stopped.

<sup>b</sup> Excludes one couple with one planned pregnancy after first but the months of planned exposure not reported.

ence of 2.4 between these extremes, and that of 2.1 between the "two-plus-too-many" and the "number planned" groups, are moderately significant statistically, but the differences between the other groups are too small to be statistically significant for the number of cases involved. The largest of these differences in months of exposure without contraception per conception (2.4 months) could account for less than one-fourth of the difference of 10.8 months between the "quasi-planned" and the "two-plus-too-many" groups in the average length of the interval from marriage to first conception. (Compare Tables 8 and 13.) The second largest difference in months of exposure per conception (2.1 months) is barely one-fifth of the difference in the average length of the interval.

In comparing the fecundity of the planning groups on the basis of exposure when contraception was stopped to have the first child it is necessary to omit the "two-plus-too-many" group because it contains only three couples with this exposure. In the other groups the average months of such exposure per conception varies from a high of 4.6 for the "number planned" group to a low of 1.8 for the "one-too-many" group. Although the base is small in each case (fourteen and forty couples respectively) the difference of 2.8 months between these rates is significant statistically. Its effect was more than offset by those of other factors, however, for the difference between the average length of the first interval for these two groups is 0.7 months in the other direction.

As brought out earlier, most of the couples who did not practice contraception before the first pregnancy began to do so soon afterward, hence after the first pregnancy none of the "number and spacing planned" couples and only twelve to forty-nine of those in the other groups had exposure to the risk of conception prior to the first use of contraceptives. But because some of these couples did not begin contraception until after the third (or later) pregnancy, the aggregate amount of such exposure is fairly large (237 to 819 months). Variations between groups in months of this exposure per conception are

small, the highest rate being 12.4 (the "quasi-planned" group) and the lowest 10.8 (the "number planned" group). The difference between these rates (1.6 months) is not significant statistically, and seems to have had little influence on the difference between the average length of the second and third intervals for the two groups, because the more fecund group according to this test had a second interval 9.4 months longer, and a third interval 12.8 months longer, than the less fecund group.

The fourth comparison of fecundity utilizes the exposure when contraception was stopped in order to have the second (or subsequent) pregnancy. Such exposure was reported by many couples in the "number and spacing planned" and "number planned" groups (149 and 188 respectively) but by a small number (six to twenty-nine) in each of the other groups. The average months of exposure per conception is nearly the same for the "number and spacing planned," "number planned," and "quasi-planned" groups (5.4, 5.2, and 5.6, respectively), but is much lower (2.6) for the "one-too-many" group. The differences between this measure of fecundity for the "one-too-many" and the corresponding rates for each of the other groups are not significant statistically, and appear to have little relation to the differences in average length of the second, third and fourth intervals for the groups. Instead of having the shortest intervals, as indicated by this test, the "one-too-many" group had about as long a second interval as the "quasi-planned," and a substantially longer third interval.

In summary, three of the four comparisons just made show statistically significant differences between the fertility planning groups in the time required to conceive when contraception was not practiced, but all the differences are small. Moreover, the ranking of the groups is not the same in each case, *e.g.*, in the "quasi-planned" group the first conception occurred relatively quickly (2.5 months) when contraception was stopped for that purpose, but the second and subsequent conceptions relatively slowly (5.6 months). Finally, and most important,

most of the differences in rapidity of conception either are small compared with those in the average length of the interval or appear unrelated to them, some even being in the opposite direction. It is clear, therefore, that during the periods covered by these tests the fecundity of the women concerned was approximately the same in one fertility planning group as in another, and played little, if any, part in causing the observed differences in the spacing of pregnancies.

#### F. MEASURING THE ACTUAL AND THE DESIRED EFFECT OF FERTILITY PLANNING ON REPRODUCTION

The actual effect of fertility planning on reproduction may be measured by comparing for each planning status group the average number of pregnancies or live births which were reported per couple and the number which would be expected if contraception had not been practiced. In computing the latter the months of exposure which would be required for each conception are estimated from the data in Table 13. Secondly, the average length of each additional pregnancy is assumed to be the same as the average for the pregnancies which were reported. Finally, one month is allowed for each puerperium. The results are shown in Table 14 and Figure 3.

If all the "relatively fecund" couples had refrained from contraception and been exposed to child-bearing under the foregoing conditions, the number of conceptions per couple would have varied very slightly with planning status (from 8.0 in the "number planned" group to 7.4 in the "quasi-planned" group), and would have averaged 7.7 for all couples. (See Table 14.) The actual number was much smaller (less than three) in each of the groups except the "two-plus-too-many," in which the average was five. It appears, therefore, that the desire to plan fertility, implemented by contraception, reduced the average number of conceptions and live births per couple in the "number and spacing planned" group by nearly 85 per cent, in the "two-plus-too-many" group by less than 40 per cent, and in the other three groups by between 63 and 71 per cent during the



Table 14. Reduction of reproduction due to attempts to plan fertility, by fertility planning status.

EXPOSURE, PREGNANCIES, AND PER CENT REDUCTION	ALL COUPLES	FERTILITY PLANNING STATUS				
		Number and Spacing Planned	Number Planned	Quasi- Planned	One- Too- Many	Two- Plus- Too- Many
1. Number of Couples	1,444	403	205	454	280	102
2. Average Months Married* Pregnancies and Live Births	155.4	156.9	153.6	154.8	154.7	158.1
Assuming no Attempts to Plan Fertility						
3. Average Months Re- quired for First Conception <sup>1</sup>	5.0	4.3	6.2	5.9	4.6	4.2
4. Average Months for First Pregnancy and Puerperium <sup>2</sup>	9.6	9.6	9.5	9.5	9.6	9.6
5. Average Months Af- ter First Puer- perium <sup>3</sup>	140.9	143.0	138.0	139.4	140.5	144.3
6. Average Months Re- quired for Each Second and Subse- quent Conception <sup>4</sup>	11.9	11.6	10.8	12.4	12.0	11.6
7. Average Months for Each Second and Subsequent Preg- nancy and Puer- perium <sup>4</sup>	9.2	9.5	9.0	9.3	9.2	9.2
8. Average Number of Pregnancies After First <sup>5</sup>	6.7	6.8	7.0	6.4	6.6	6.9
9. Average Total Num- ber of Pregnan- cies <sup>7</sup>	7.7	7.8	8.0	7.4	7.6	7.9
10. Average Total Num- ber of Live Births <sup>6</sup>	6.8	7.2	7.0	6.7	6.7	6.8
Actual Pregnancies and Live Births						
11. Average Number of Pregnancies	2.3	1.1	2.6	2.2	2.8	5.0
12. Average Number of Live Births	2.0	1.1	2.3	2.0	2.5	4.2
13. Per Cent Reduction in Pregnancies and Live Births	70.4	85.2	68.0	70.4	63.1	37.6

\* Periods of sterility and of separation when not pregnant are omitted.

<sup>1</sup> The number of months of exposure without contraception before the first pregnancy (the sum of line 3 and 7 of Table 13) divided by the number of first conceptions during this exposure (the sum of lines 4 and 8 of Table 13).

<sup>2</sup> Based on the reported first pregnancies, with an arbitrary allowance of one month for the puerperium.

<sup>3</sup> Line 2 minus the sum of lines 3 and 4.

<sup>4</sup> The average months of exposure for each conception after the first is taken from Table 13, line 14, (months of exposure after the first pregnancy but before contraceptive practices were begun, divided by the number of second and subsequent conceptions occurring during this exposure). For the "number and spacing planned" couples (who had no such exposure) the simple average of the corresponding values for the "number planned" and "quasi-planned" groups is used, because the months of exposure per conception when contra-ception was stopped to have a child for the "number and spacing planned" group is the simple average of the corresponding values for the "number planned" and "quasi-planned" groups. (See Table 13, line 18.)

<sup>5</sup> Based on data for the actual pregnancies after the first. One month is allowed for each puerperium.

<sup>6</sup> Line 5 divided by the sum of lines 6 and 7.

<sup>7</sup> Line 8 plus one for the first pregnancy.

<sup>8</sup> Line 9 multiplied by the ratio of live births to pregnancies.



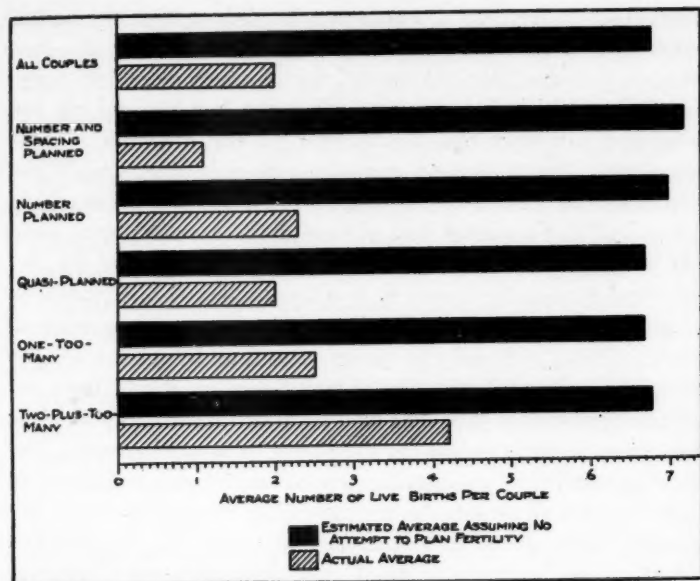


Fig. 3. Actual average number of live births per couple and "expected" number under assumptions of no contraceptive practice, by fertility planning status. (See Table 14.)

twelve to fifteen year period studied. For the "relatively fecund" couples as a whole the reduction is approximately 70 per cent. In other words the "number and spacing planned" group had less than one-sixth as many conceptions as it probably would have had without efforts to plan fertility, the "two-plus-too-many" group had slightly over three-fifths of the expected number, and all the "relatively fecund" couples had about 30 per cent of those expected.

Because of the classification system used the couples in three of the planning groups had no more pregnancies than they planned or wanted; from this standpoint the actual effect of the efforts to plan fertility was the same as the desired effect for these three groups. The couples composing the other two groups, in contrast, had a larger number of pregnancies than they planned or wanted. To determine the desired effect of

efforts to plan fertility it is necessary to deduct from the actual number of pregnancies the number occurring after the last wanted. In the "one-too-many" group there were 790 pregnancies, of which 244 occurred after the last wanted by the wife, and 256 after the last wanted by the husband. If the conception rate had been controlled in accordance with the wishes of the former there would have been 546 pregnancies, if the husband's wishes had governed there would have been 534 pregnancies. The number of pregnancies wanted by the wife and husband, therefore, was approximately 70 per cent of the number they had. In this group the actual practice of contraception reduced the pregnancy rate by about 65 per cent; the successful practice of contraception would have reduced it another 30 per cent or a total of 75 per cent, which is very close to the average for the three "planned" groups. The average number of pregnancies per couple for this group would then be 2.0 if the wife's desires prevailed, or 1.9 if those of the husband were dominant. This is fewer than the number desired by the "number planned" and "quasi-planned" couples but slightly more than the average for these and the "number and spacing planned" couples combined.

In the "two-plus-too-many" group there were 506 pregnancies, the number after the last wanted being 282 for the wife and 288 for the husband. If these couples could have controlled their fertility according to their wishes they would have had between 218 and 224 pregnancies. Partially effective contraceptive practices reduced the number of pregnancies by 36.7 per cent; contraception sufficiently effective to give the control desired would have reduced it by about 73 per cent, nearly as much as in the case of the other four planning groups. This group would then have averaged 2.2 pregnancies per couple, as compared with the desired number of 1.9 or 2.0 for the "one-too-many" couples and the actual number of nearly 1.9 for the three "planned" groups combined.

Improvement in the ability to control fertility would have a much smaller effect on the birth rate of all the "relatively

fecund" couples in the study, because less than 30 per cent of them are in the two groups just discussed. Nevertheless, if no couple had had more pregnancies than desired the average number for all couples would have been 1.9 instead of 2.3, a reduction of 17.4 per cent. If opinions regarding the number of children wanted remain as reported by the "relatively fecund" couples in this study a decline in the birth rate approaching this amount (17.4 per cent) would be expected merely from an improvement in the effectiveness of contraception.

Although a further decrease of about 17 per cent in the fertility of urban couples like those in this study is sufficiently large to have important consequences, it is small compared to the changes which could result from an increase or decrease in the number of children desired. If half of the childless couples had had one child and those with one, two, or three had had another, the birth rate would be higher by over 34 per cent. In contrast, if each of the couples with one or more pregnancies in the "number and spacing planned" and "number planned" groups had omitted the last (which could have been done by nearly all on the basis of their contraceptive practice) the pregnancy rate would be lower by nearly 15 per cent.

It is altogether probable, therefore, that future changes in the fertility of such a group will depend primarily on changes in their attitudes toward having none, one, two, or other numbers of children. Information regarding these attitudes and the factors influencing them was gathered in this study, and will be analyzed in subsequent articles.

#### SUMMARY

A large majority (nearly 90 per cent) of the couples included in this study tried to control the number of children and their spacing by means of contraception. Nearly all of those who did not make this effort were "relatively sterile," for over 98 per cent of the "relatively fecund" couples practiced contraception. About two-thirds of the couples began their attempts to plan fertility at marriage; about half of the remainder began before the end of the first puerperium.

Approximately half of the "relatively fecund" couples who tried to prevent or postpone the first or second pregnancy were successful in their efforts; between 58 and 63 per cent were successful with respect to the third, fourth, and fifth. In the interval before the first pregnancy "success" consisted in postponement rather than prevention in over three-fourths of the cases, but by the time the interval after the third pregnancy was reached prevention constituted success in nearly 90 per cent of the cases. Most of the couples who failed to prevent a pregnancy or delay it as long as desired were able to lengthen the interpregnancy intervals greatly in comparison with the noncontraceptors.

"Relatively fecund" couples can be classified as to the planning of fertility on the basis of the effectiveness of their use of contraception, and their attitudes toward each pregnancy. The categories used in this analysis are:

(a) "Number and spacing planned."<sup>19</sup> These couples succeeded in preventing pregnancies altogether, or conceived only when contraception was stopped because a child was wanted.

(b) "Number planned." The last pregnancy, but not all of the preceding pregnancies, of most of these couples began when contraception was stopped to have a child.

(c) "Quasi-planned." The last pregnancy of these couples was not planned, but either it or another pregnancy was wanted by both the wife and husband.

(d) "One-too-many." The average of the number of pregnancies after the last wanted by the wife and the number after the last wanted by the husband is one-half, one, or one and one-half.

(e) "Two-plus-too-many." The average of the number of excess pregnancies according to the wife and according to the husband is two or more.

Approximately 28 per cent of these "relatively fecund" couples are "number and spacing planned," 14 per cent "num-

<sup>19</sup> The labels for categories (a) and (b) are not strictly accurate descriptions of each couple in those groups, since there were certain borderline cases.

ber planned," and 31 per cent "quasi-planned." Less than 20 per cent are in the "one-too-many" group and only about 7 per cent are in the "two-plus-too-many" group. If the classification is based on live births or living children instead of pregnancies the distribution differs only slightly from the foregoing.

There is a strong relation between size of family and success in planning fertility. The average number of pregnancies per couple is lowest (1.2) in the "number and spacing planned" group, highest (5.0) in the "two-plus-too-many" group, and between 2.2 and 2.8 in the three intermediate planning groups. Live births and living children vary similarly. Few of the "number and spacing planned" couples, but most of the "two-plus-too-many" couples had more than two children.

Opinions as to the spacing of children are quite uniform. Between 68 and 76 per cent of the couples in each group said the "most desirable" time for the first child is two to three years after marriage. Between 81 and 89 per cent said the "most desirable" time between subsequent children is two to three years. The actual spacing of children, in contrast, varied widely from group to group and from the reported "most desirable" spacing. A large majority of the couples in the "number and spacing planned" group postponed their first child more than three years, but a large majority of those in the other groups had it within two years. Subsequent intervals tended to be longer than "most desirable" among the "number and spacing planned" and "number planned" couples, and shorter than "most desirable" among the "two-plus-too-many" couples.

Nearly all of the husbands but only a little more than one-third of the wives knew of one or more methods of contraception before marriage. Nearly all of the other wives obtained similar information before the second pregnancy. In consequence, variations in time of learning about contraception were of only minor importance in determining the fertility planning status of couples, and the average size of family for the planning groups. Differences in the rapidity of putting knowledge into

effect were of some importance, however. The couples in the "number and spacing planned" group began at once their attempts to space pregnancies on a "motive" or "action" basis, but 40 to 50 per cent of the couples in the other groups waited until after the first pregnancy or later.

The fertility planning groups appear to have differed only slightly in fecundity—the ability to conceive and bear a child. The differences which can be found are too small to have accounted for an important part of the differences in the success of fertility planning, or in size of family.

Variations in the ability to use contraception effectively were responsible for most of the differences in average size of family among these "relatively fecund" couples. There were no accidental conceptions to the 403 couples in the "number and spacing planned" group during the 56,613 months that they practiced contraception. But among the "two-plus-too-many" couples there was one accidental first conception for every 8.7 months when contraceptives were used, and one accidental second or subsequent conception for every 29.4 months of such exposure. Because of these differences in ability to control family size and spacing by means of contraception the fertility of the "number and spacing planned" couples was reduced by nearly 85 per cent, that of the "number planned," "quasi-planned," and "one-too-many" couples by 63 to 71 per cent, but that of the "two-plus-too-many" couples by less than 40 per cent. If fertility had been left to nature the number of pregnancies per couple probably would have averaged between 7.4 and 8.0 in each group. But as a result of planning there were only 1.1 pregnancies per couple in the "number and spacing planned" group, 2.2 to 2.8 in the "number planned," "quasi-planned," and "one-too-many" groups, and 5.0 in the "two-plus-too-many" group.

In spite of the foregoing reductions in fertility the couples in the last two groups had larger families than they desired. If they had been able to prevent the conceptions which occurred after the last wanted by the wife or husband they would

have lowered their fertility by 75 and 73 per cent respectively, or about as much as all the other couples. The average number of pregnancies per couple would then have been 1.9 or 2.0 for the "one-too-many" group and 2.2 for the "two-plus-too-many" group (or very slightly more than that for all other couples) and the fertility rate of all the "relatively fecund" couples would have been reduced about 17 per cent.

With less than one-fourth of the "relatively fecund" couples in such an urban group having more children than they want and nearly three-fourths having just the number they want, it is evident that the future trend of the birth rate for the entire group is going to depend in important degree on the changes which take place in the number of children wanted. It is extremely important, therefore, to try to determine which social and psychological factors influence the number of children desired, and analyse their effectiveness. Information on these matters was collected in the Study, and will form the basis for subsequent articles in this series.